FLASHES AND PLUGS

EARLY TELEPHONES. The early telephones were oversimplified—you used the same gadget to talk through as you did to listen through. Telephone directories always displayed this warning: "Don't talk with your ear or listen with your mouth."

Another familiar warning was: "Give your call without unnecessary remarks!" This was for the benefit of those pests who were not quite familiar with the correct telephone procedure, and who often wanted to pass the time of day with the operator.

• • •

"EAR OF DIONYSIUS." The oldest known acoustic device was the famous "Ear of Dionysius," a tapering rock passage built by the Tyrant of Syracuse into one of his prisons so that spies could listen to what prisoners said when they thought themselves alone.

• • •

WARTIME OPERATORS. To most Americans one of the pleasant memories of the war, says the magazine *Living*, will be *"the cheerful, unchanging voice of the telephone girl, her patience and cooperation at a time when the national stockpile had run low on such things."*

• • •

LINEMAN WARNER BAXTER. B. E. (Hap) Gloyd, recently retired Ohio Bell installation foreman, has many memories of his 50 years of telephone service.

At one time when "Hap" was engaged in training new telephone employes in the rudiments of climbing poles, stringing wires, installing telephones and various other operations connected with the job, a young man who showed particular aptitude for climbing poles was included in his group. This young man worked for the Ohio Bell in Columbus for a year and later moved on to broader fields. He is now internationally known as a movie star—*Warner Baxter* by name.

At a recent dinner in his honor "Hap" recalled an incident that occurred when Warner Baxter was in his employ.

"We were driving over the covered bridge which then spanned the Scioto at West Broad Street," said "Hap."

"The line crew, Warner Baxter included, were jogging along in a cart behind a sturdy southern mule. In the middle of the bridge, the mule's disposition asserted itself and he lay down, leaving traffic at a standstill. One of the technical men in the crew suggested wiring the animal to a magneto telephone and turning the crank. One wire was attached to the mule's ear and the other to the tail, the crank turned and the mule finished his trip across the bridge in a big hurry."

• • •

TELEVISION TO RIDE THE RAILS! Railroads are planning to install television cameras on the front of many of their locomotives. A view of the "country ahead," hitherto enjoyed only by the man at the throttle will be piped to passengers in lounges and diners.

• • •

DUMMY BOARDS. A unique apparatus for training student operators is being used in several places by the Northwestern Bell. Exact photographic reproductions of switchboards are attached to wooden frames to simulate actual switchboards. A minimum amount of keys and circuits are installed on the dummy board and students are trained just as if they were sitting at a sure-enough switchboard.

When there were margins of reserve lines on switchboards training could be done on the switchboards themselves. Now the lifting of ceilings has limited this possibility.

TELEPHONY

The Journal of the Telephone Industry

APRIL 27, 1946

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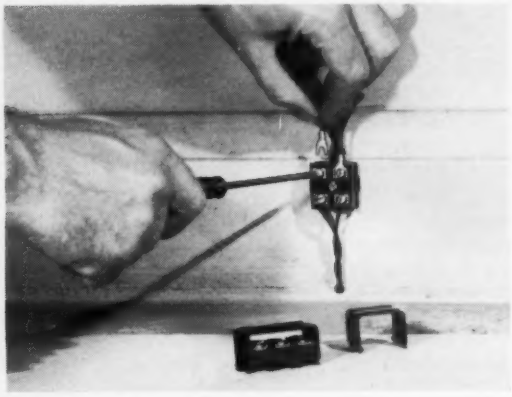
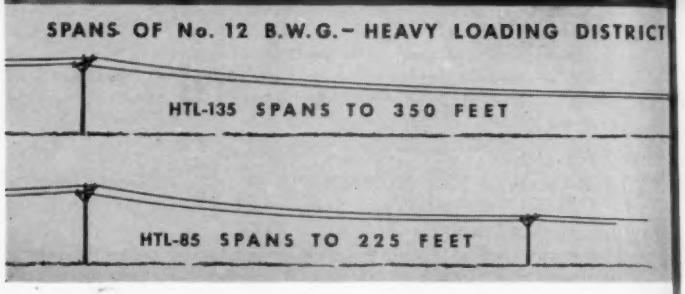
U. S. A.

Eliminate Costly Service Trips necessary to replace wornout dry cells by installing the Electrox A3V Battery Eliminator. This unit provides smooth, noiseless current for the operation of one magneto telephone and replaces the two dry cells usually used. Made by SCHAUER MACHINE CO.

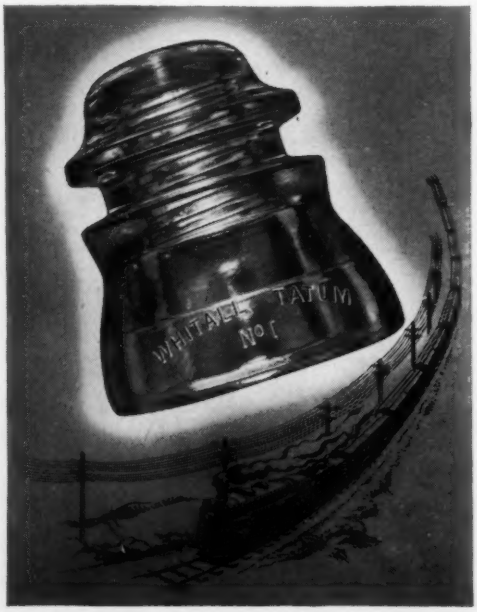


Has All the Answers! Kellogg Connector Blocks have every feature needed to save installation time and assure foolproof connections. U-shaped gripper plates take spade or spike tips on any size wire. Block is shaped to hold tips in place without lateral movement. In 2 and 3-point sizes.



Save Two Ways on line wire replacement and construction by standardizing INDIANA STEEL AND WIRE COMPANY'S Crapo HTL-135 and Crapo HTL Line Wire. Because of their high tensile strength, these wires permit long sp enable you to realize substantial savings in construction and maintenance c They are Galvanized by the famous Crapo Galvanizing Process.

Long Life Expectancy is built into pressure-treated Southern Pine Poles and Crossarms. Carefully and thoroughly treated by the AMERICAN CREOSOTE WORKS, INC. these poles have the extra durability required for dependable service under the toughest climatic conditions.



Meet Every Service Need. That's why so many telephone companies are using Armstrong's Whitall Tatum Insulators, made by ARMSTRONG CORK CO. Some of their outstanding features are crystal clarity of glass, accurate gauging, resistance to variations in temperature. A good bet for lower maintenance costs.

Drier Than the Driest Desert! The safe, e to dry splices in lead covered cables is to Drierite Desiccant among the conduc makes the splice about the driest part cable. This W. A. HAMMOND DRIERI product will not harm conductors or in

POSTWAR TELEPHONY

BY RAY BLAIN

PRIOR to VE and VJ-days, numerous predictions were made as to what would happen to the telephone industry in the postwar period. According to some of the prophets, we would be forced to discard all the equipment we have been using and replace it with new and "super-duper" gadgets. Electronics were to play a most important part in our everyday life. Some even went so far as to claim that radio channels would replace all wire and cable channels. We were to be required to carry a radio transmitter and receiver in our hats.

But since the end of the war, a sobering effect has been noted and most of these prophets have lowered their sights somewhat. It now is agreed generally that changes in the telephone field, when required, will be gradual. Also, many things which have been tried and proved need not be changed until such time as something definitely better can be made available.

Neither do we hear so much about electronic applications as formerly. While we do agree that these will continue to play a most important part in the communication world, radio probably will not replace wire in any except a few isolated cases. It is felt certain, though, that radio will play an important part in the provision of telephone service where the use of wire facilities is prohibited. Undoubtedly, many two-way radio sets will be installed in automobiles during the next few years. This action certainly will increase considerably the over-all value of telephone service.

In this series of articles, we shall attempt to offer a few opinions, observations and predictions of postwar telephone possibilities. We also shall attempt to suggest new tools and equipment and explain how each may be used to advantage. It is hoped that these suggestions will not be considered radical for we shall make every effort to stay within the bounds of reason.

The work of the writer in connection with wartime communication during the past five years has indicated various peacetime possibilities for equipment developed for the armed services. We now present these suggestions in the hope that at least a few may prove useful to the telephone industry.

Before we attempt to describe individual items, a general resume will be outlined as to what, in our opinion, may be expected in the way of trends in the industry. These views are based on the general conclusions reached after considerable study of the subject by manufacturers, engineers and managers of telephone operating companies.

Contrary to the belief of many, considerable manual central office equipment will continue to be used. The use of dial equipment will, in all probability, continue to increase due to the upward trend in minimum wage rates. Unattended dial systems will continue to meet a most important need. Both dial and manual central office equipment will be improved gradually in the future as it has been in the past. Radical changes neither are desired nor expected.

Central office equipment arrangement and installation undoubtedly will be simplified and improved. An increasing amount of equipment assembly work and wiring will be performed in the factory more cheaply and with better results than is possible on the job. This policy will tend to simplify the installation of equipment in the field. Such a trend meets with the approval of both manufacturing and operating organizations and should be encouraged.

It is probable that some action will be taken to jack in parts of equipment so that they may be removed for test

A FEW OBSERVATIONS AND PREDICTIONS

Originally it was intended to present a complete review of major postwar telephone equipment in this issue, but it was found that some manufacturers are not yet prepared to announce many of their new items.

Therefore, instead of purporting to give a complete survey of future developments, Mr. Blain, in this article, offers a few opinions, observations and predictions of postwar telephone possibilities. The article is followed by illustrations of various new tools and equipment and up-to-date construction and maintenance methods with explanations as to how each may be used to good advantage.

or returned to the manufacturer for repair. This feature might prove desirable to many of the smaller companies which do not have the necessary trained personnel to handle such repair work.

Extensive improvements have been made in telephone power equipment during the past few years and what further changes are in prospect is anybody's guess. There is talk that clear plastic jars eventually will be used to house storage batteries as it is thought that such construction will facilitate shipment, installation and maintenance.

The automatic control of power equipment now is generally accepted. It is believed that all large exchanges eventually will be equipped with gas engine operated generators. These will, in most cases, start automatically, in the event of a power failure. The floating method of battery charging commonly is accepted now and undoubtedly will be continued.

Outside plant construction will change very little, although certain trends will be pronounced in some localities. Underground construction will increase in congested and severe storm areas, while aerial construction will, from necessity, be continued in sparsely settled areas.

Use of cable will be increased in many areas and over greater distances. There also is a definite trend toward the practice of extending small feeder cables into buildings to reduce the need of drop wire. This does not mean that there will be any reduction in the amount of open wire used. The use of the spinner method of cable suspension will increase as will the use of cable rings.

Cable splicing is expected to be simplified considerably in the future. The old wiped metal joint soon may be a thing of the past. Splice covering either will be a clamped-on affair or seams will be closed by soldering with a gas torch or an arc type lead burning tool.

Subscriber's station and cable protection will receive more attention in the future than in the past. There will be some improvement in protectors, but this will not be overly important for this equipment has for the past several years proved to be exceptionally good. The only difficulty has been that it has not been used properly and extensively in all cases. We gradually are being convinced that adequate and properly designed protection pays big dividends.

Drop wire always has been a weak link in our outside distribution systems and the cause of numerous troubles and service interruptions. Material improvement already has been made in this item. The new plastic and synthetic rubber insulations now being utilized provide a light weight and more lasting drop wire. This new wire will, it is believed, eliminate most wet weather troubles.

Best Story of the Week — What's Yours?

A friend called up a telephone subscriber late one evening. "I was hoping to come out, but I can't remember your new address," he said.

She told him, and then with surprise, she asked, "But if you don't know our street number, how do you happen to know our telephone number?"

"Oh," he answered fatuously, "I looked that up in the telephone book."

And with his finger on the street address called his friend to ask for it.

Improvements in cable terminals, in general, are not considered necessary. We are of the opinion, however, that a type will be developed which will be low in cost and easily can be installed to provide for a few lines so that the lengths of drop wire can be reduced to a minimum. In all probability, this terminal will be installed without the services of a cable splicer.

Compression type sleeves installed with a hydraulic tool will reduce the use of guy clamps on messenger strand to some extent.

Treated wooden poles undoubtedly will continue to be the main support of all aerial plant. It is believed, however, that there will be attempts from time to time to popularize the use of metal and concrete poles.

Changes in telephone instruments will be gradual. There is a general tendency to have component parts arranged so that they may be changed without making soldered connections. Parts either will be jacked in or connected with a screwdriver by the use of screw terminals. Special magneto telephones may not be required in the future because common battery telephones may, with a few simple changes, be converted to local battery service. There is some comment on the possibility of mounting a hand generator in the dial opening of a common battery telephone when it is to be used for magneto service. Now, also, with commercial electric power available at most rural telephone locations, battery eliminators are available.

Retractable cords are proving extremely popular and unquestionably they will be used extensively as time goes on.

Carrier frequency equipment certainly will come into more general use during the next few years. While at present power line carrier is in the trial stage, it is believed that in time telephone carrier systems will be superimposed on power circuits; also physical wire lines. If a "cheap" carrier system can be designed to add 10 or more channels to a pair of wire, it can be used to good advantage both for rural and short haul toll. It might even be used to advantage to replace some small, unattended exchanges.

In all probability the majority of telephone companies will keep some carrier equipment on hand so that special telephone service, when required for comparatively short periods of time, can be provided at low cost.

We feel free to predict, without fear of contradiction, that the greatest changes and improvements will be in tools. Their proper use not only will remove much of the drudgery from telephone work, but also will make possible the completion of a better job in less time.

The line construction truck of the future may be equipped with both a small air compressor and a gas engine-operated generator. Numerous electric hand tools can be used to advantage out on the line and this now is made possible by small generators. Compressed air also is useful for operating tools and for cleaning and painting by the spray method.

Construction and maintenance trucks will continue to be improved in the future as they have been in the past. A good line truck, equipped with a winch and pole derrick, always is a good investment for any telephone company. The five or seven-man cab unquestionably will be a "must" in the future.

More extensive use will be made of the earth boring machine and earth auger in the future.

There is an indication that considerable development may be expected in all testing equipment. This does not infer that telephone testing equipment has not been good in the past for it has been, but its use has not been extensive, and, in some cases, it has proved rather difficult to operate. These objections undoubtedly will be overcome soon.

During the war, our country's tremendous production was made possible, to some extent at least, by the fact that skilled jobs could be performed by unskilled workers after comparatively

short periods of training. Certainly this same principle can be applied to postwar telephone work.

One manufacturer has developed a machine which will test a position of a manual switchboard, and detect and locate any and all cases of trouble. Similar machines also have been used to some extent for testing dial equipment. It would seem that the same general principle could be used on all telephone maintenance equipment. For example, testing equipment could be provided to test a complete manual or dial telephone system, detect and locate trouble. This system, it is believed, would accomplish two objectives: (1) Provide better service resulting in fewer service interruptions, and (2) make possible the use of a fewer number of highly trained workers. Routine testing and inspection certainly has proved its value in connection with preventive maintenance in the communication field.

Portable field testing instruments will be numerous and extensively used in the future and will, in the greater part, be the direct reading, easy-to-use type.

Extensive research on housing suggests many improvements in future central office buildings. While basic building materials have not been changed essentially, there have been radical changes in methods of fabrication. New telephone buildings, in general, will include complete air conditioning, thorough insulation from heat and cold, and sound absorbing material. Certain new materials such as plywoods resinfied for greater durability, highly resistant plastics and newly developed steels and light alloys probably will be used to advantage in these buildings.

Enduring paints, with hard surfaces in which dirt particles cannot become embedded, are ready for postwar use and should prove a blessing to the telephone industry. The petroleum industry now is making oils which dry more quickly than linseed oil, commonly used in paints. This certainly is a step in the right direction and it undoubtedly will eliminate troubles caused to equipment by turpentine and other ingredients.

By the use of the electronic tube, the spray gun now can be used to paint central office equipment such as power boards, cable racks and main frames. This device provides a high electric potential difference between the paint spray nozzle and the object to which the paint is being applied. With this arrangement, it is possible to paint all around a pipe at one time. While this method is applicable only to metal objects, it does assist the painter in the telephone exchange when working in tight places. The tiny atomized droplets of paint are given electric charges as they leave the spray nozzle that are of opposite sign to that on the object being painted. This adds impetus to the droplets and even pushes them along curved paths. Then, also, no mist or paint flies about to smudge other nearby equipment or to be breathed by the painter.

A new type of rubber insulation material which may be used to check the transference of heat, cold and noise weighs only 1.5 lbs. per cubic foot, compared with 12 lbs. for cork. Complete insulated and polished walls will reduce losses of heat from a room so that smaller heaters may be used. Heat may even be applied by high frequency electro-magnetic methods, or by infrared rays. Space heating may be used in which heating coils are embedded in entire floors or walls.

Light sources, which will produce soft and luminous radiant effects, minimizing eye strain, may be built into walls, ceilings and switchboards. The color of the emitted light may be changed automatically according to a prearranged schedule, or regulated to the mood of the individual concerned. For example, an orange or soft yellow light might boost the morale of operators on stormy days and cause them to perform their duties in a more efficient manner. Walls may even store up light during the day and radiate it at night. Dust particles and pollens will be removed from the air by electric and magnetic devices, thus minimizing both sweeping and cleaning of equipment. Radiant tubes, such as violet ray, will destroy harmful bacteria causing winter colds and allied sickness, which result in loss of time to the employe.

Unquestionably, aluminum will be used extensively for roofs. This material reflects heat, is weatherproof and long lasting, with low maintenance costs.

Floors probably will be either terraza, asphalt tile or linoleum. Such floors are sanitary, easily cleaned and serviceable. Windows will be closed and sealed. They also will make use of double glass which reduces heat transference and condensation.

Aluminum venetian blinds will be used widely.

Operating rooms will be acoustically treated to reduce the noise level and increase the over-all operating efficiency.

The use of loud speaking systems controlled from telephones undoubtedly will increase. This certainly will prove an advantage as an official of any large concern may be connected, by the use of a telephone, to the public address system and address all employes of the establishment.

Use of voice paging systems in connection with future telephone systems undoubtedly will increase.

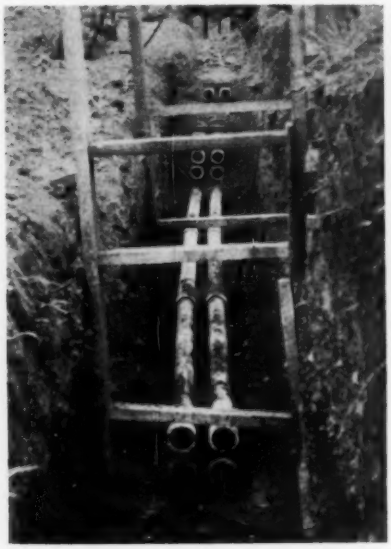
There is every reason to believe that voice recording will serve many useful purposes in the communication industry. Authorized telephone recording, if and when made available, will be welcomed and widely used by a large number of subscribers. Recorders also will prove useful for service observance purposes. If operating errors are recorded, the personnel making the mistakes may be corrected effectively and, in many cases, future troubles may be prevented. Recorders already have proved their worth in the training of student telephone operators. This method of instruction certainly will increase in the future.

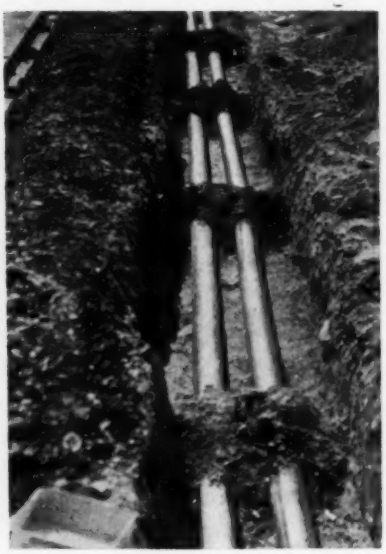
It seems likely that all dial telephone systems of the future will be equipped with a time device of some type whereby subscribers will receive the correct time by dialing a special number. Even though clocks constantly are being improved, there always will be a need for checking against some central standard. Suitable talking clocks have been developed and used in Europe. The writer believes that similar equipment can be made available for use in this country when a need for such service is indicated.

Manufacturers are to be commended for their willingness to improve the design of equipment with a view toward reducing trouble in the field and it is believed that this trend will continue. Most manufacturers always are willing to correct and make necessary adjustments on any of their equipment which develops defects in the field. Use in the field, under actual operating conditions, often reveals a weakness in design which cannot be detected even after exhaustive laboratory tests. This cooperation between manufacturers and operating companies makes possible rapid development and a trend toward trouble-free equipment. No doubt this arrangement will continue to be one of the most important advantages enjoyed by the Independent telephone industry.

The illustrations of modern tools and equipment on the following pages are presented in the hope that some useful suggestions will be offered to the operating telephone field. Some of these ideas are tried and proved while others are offered for consideration and possible future adoption.

Construction Kinks





UNDERGROUND CONDUIT: Underground conduit construction undoubtedly will increase considerably in the future. While this type of construction is more expensive, maintenance cost is less and service interruptions are less frequent. When planning new underground construction, the type of conduit to specify should be carefully considered. The following types may be considered, one or more of which will ordinarily be readily available in any locality: (1) Cement asbestos (left photo), (2) fibre conduit (center photo), (3) vitrified clay (right photo) and (4) creosoted wood.

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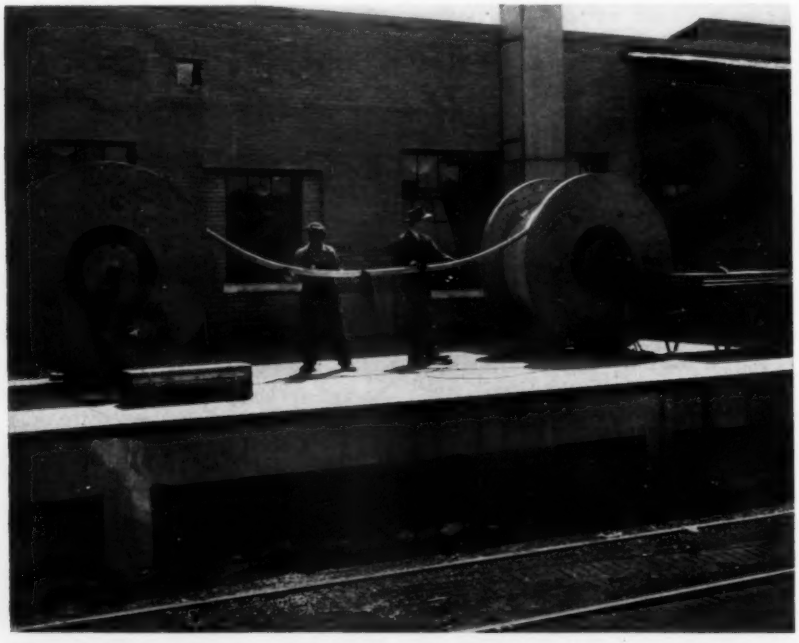
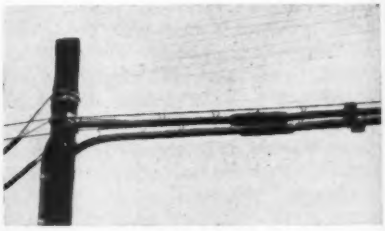


POWER CABLE REELER: The power cable reeler will prove indispensable to large telephone companies. This is a gas engine driven arrangement which may be connected to any large reel and used to coil cable on one reel as it is moved from another. This arrangement may be used to prove a worthwhile economy.



GRADE CLAMPS: Construction men agree in most cases that grade clamps should be used when there is the slightest danger of movement of the cable. This especially applies to underground dips as shown in the above photograph, also terminals, cable crossovers, etc.

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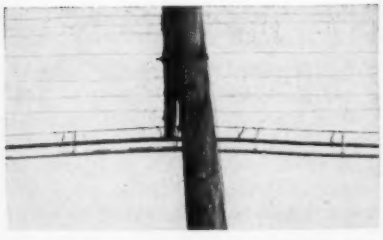


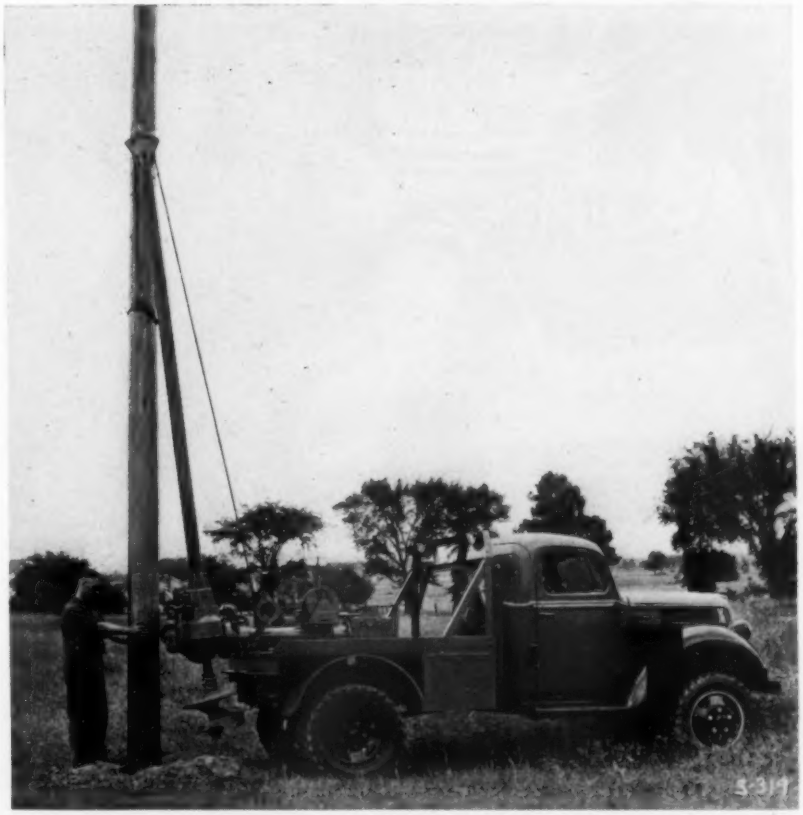
EXTRA LONG CABLE RINGS: Extra long cable rings have been used successfully in some sections of the country to permit two cables to be suspended from one messenger strand.

SMALL EARTH DRILLS: The small earth drill is used extensively by telephone companies. These drills are comparatively inexpensive and prove a good investment for even the small telephone company. They will drill in mud, sand or clay without grabbing. The drills may be powered either by a gas engine operated generator and an electric motor or an air compressor and air power. The drill may be operated by a flexible shaft driven from a gas engine, if desired. On one job in dry and hard soil, three men drilled holes and set 49 poles in seven hours with this type of drill.

WIRE PLOW: The plow method of burying wire has proved entirely satisfactory in the past and will, in all probability, be more extensively used in the future. While it is true that some buried wire installations have not proved successful in the past, due to rodents or inadequate lightning protection, trouble has not been traced to any fault in using a plow to install it.

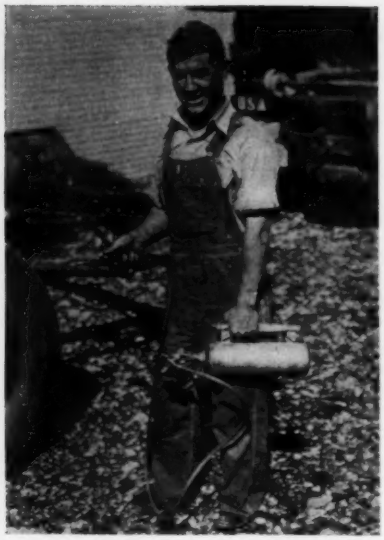
CABLE SPINNER: The spinner method of cable suspension is being used to a considerable extent. The above photograph shows a sample of this type construction.

SOLDERING IRON: A new type of electric soldering iron known as the "speed iron" or "gun" is shown above. It is claimed that five seconds is all that is required to bring this new transformer type iron up to required soldering temperature. Small soldering tip permits easy access to confined places. Current is automatically shut off when the finger is removed from the trigger switch.



EARTH BORING MACHINES: There is no doubt that a standard earth boring machine mounted on a truck proves a good investment for any telephone company that has considerable pole hole digging over terrain which is not too rough. The standard machine digs holes six to 20 inches in diameter and from seven to 10 feet deep. These machines will dig in clay, hardpan, shale or frozen ground. This same machine may be equipped with a 2,500 pound capacity winch and a suitable pole derrick for handling 40 to 45 foot poles.

GASOLINE GENERATORS: Electrically operated tools, such as saws, drills, hammers and planers always prove real labor savers for a line gang. Until a few years ago, the problem was to obtain electric power out in the country. There now are available small gasoline operated generators which may be carried by one man to operate all of these tools and to power flood lights when required in repairing line breaks.

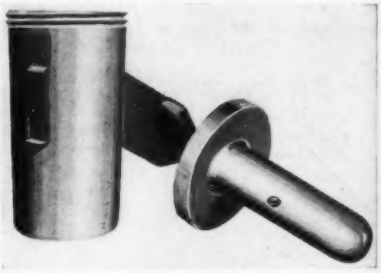


ACETYLENE TORCH: The acetylene torch is useful for various types of soldering. It won't replace the ordinary blowtorch or fire pot, but is satisfactory for certain telephone work. For example, small sheath openings in aerial cable can be soldered satisfactorily with this torch.

PAINT SPRAY: A small, compressor operated paint spray will be found more efficient than a brush for some paint jobs. Several types of small compressors are available which may be powered by gasoline engine or electric motor.

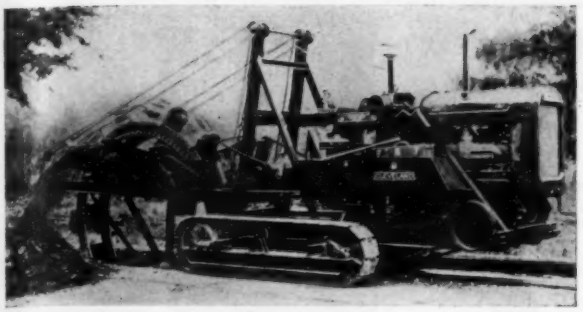
★ ★ ★ ★

MANHOLE VENTILATION: Every precaution should be taken to ensure that underground cable manholes are free of gas before workmen enter them. This is especially true of nitrogen gas which cannot be readily detected by tests. The best and safest method is to ventilate manholes by forcing a stream of fresh air into them. The gas engine operated blower shown in the above photograph will be found ideal for this purpose.

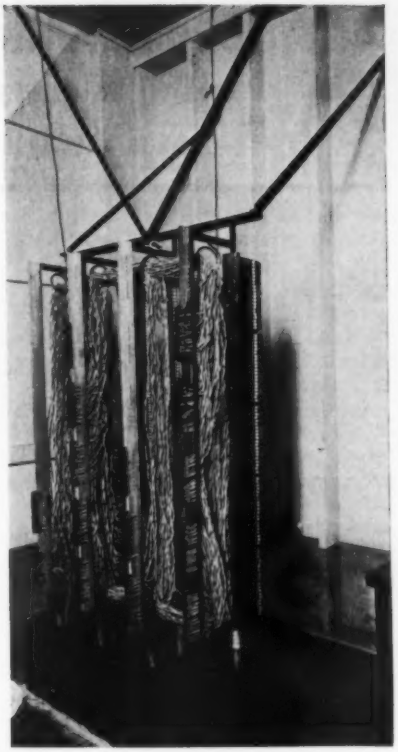


CABLE SOAP CONTAINER: It is now standard practice with many telephone companies to use soap solutions on cable to locate small sheath openings. Various types of soap containers and brushes have been improvised from time to time, but until recently a suitable container had not been manufactured commercially. The above photograph shows an aluminum container with a brush attached to the cover. A clip is arranged on one side for attaching to the lineman's belt or the cable car.

GASOLINE HAMMER: It is suitable for underground conduit work where a power drill is required and is ideal for breaking concrete and rock, digging rock, cutting asphalt, backfilling and tamping. Tools such as drills, chisels, spades, cutters and tampers may be used with the hammer.

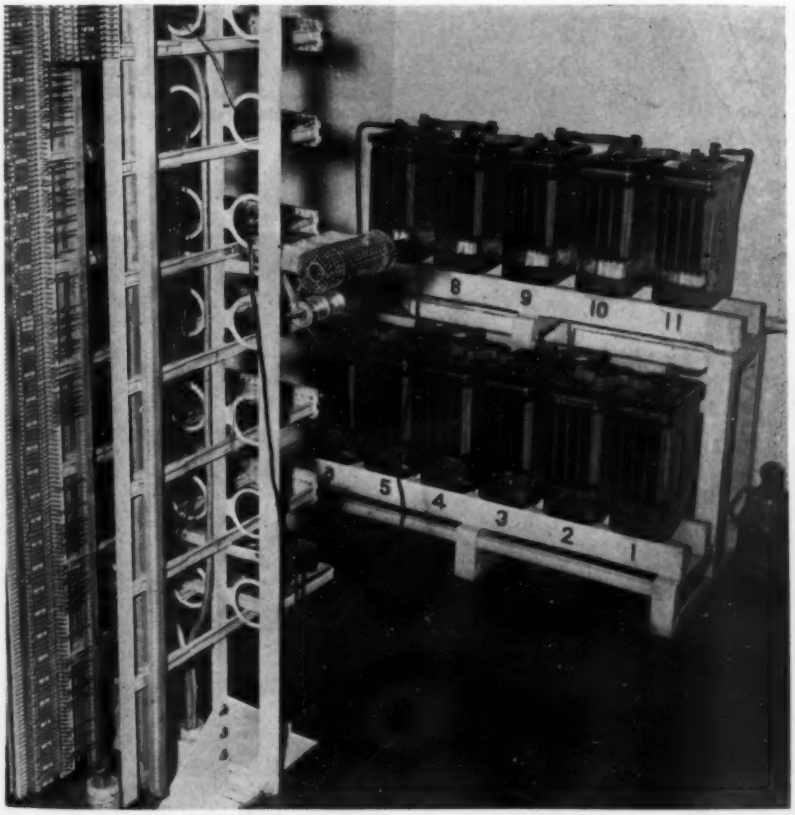


POWER TRENCHERS: The power trencher will always prove-in on large underground conduit jobs. Power operated backfillers can be used to advantage on jobs of this nature.



SELF-SUPPORTING MAIN FRAME: The above photograph indicates the difficulty experienced in bracing even a small main frame from the ceiling. This is not only an involved job, but is also unsightly. Frames of this size and larger may be arranged for floor mounting and do not require top bracing.

★ ★ ★

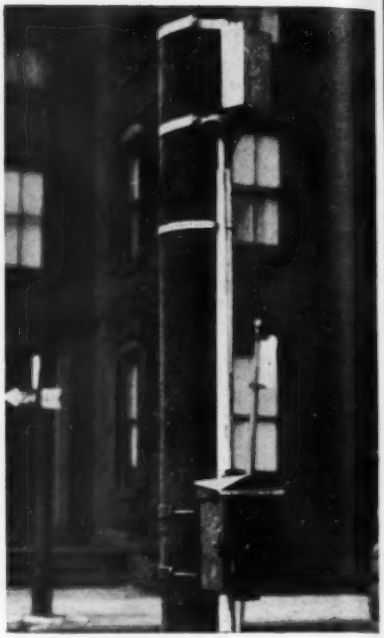


STORAGE BATTERIES: Some telephone men hold that storage batteries must be installed in an isolated vault with an outside vent. The modern sealed jar storage battery is equipped with a baffle and drain which prevents the escape of harmful moisture bearing fumes. Storage batteries always have been considered the heart of the telephone system. Undoubtedly, many batteries have been retained in service far beyond their normal lives and are long overdue for replacement. When new batteries are procured, it is desirable to obtain a suitable rack from the same manufacturer.

ADJUSTABLE PLATFORM: A small adjustable platform similar to that shown above can be used to advantage in the performance of various types of telephone work. Not only does it prove safer than a ladder, but also often saves considerable time.

CONSULT YOUR MANUFACTURERS ON NEW CONSTRUCTION AND MAINTENANCE EQUIPMENT

LADDER TRUCK: Preventive maintenance of aerial cable always will pay big dividends. If all small sheath openings are repaired immediately before moisture can enter a cable, not only will money be saved, but service interruptions will be avoided. The ladder truck is perhaps the most convenient means of inspecting cable. Workmen can inspect cable quickly and make immediate repairs when required.



SUBSTATION PROTECTORS: Use of substation protectors is increasing in the telephone industry. Operating personnel has learned that when there is an element of doubt or the slightest possibility of a subscriber's station being damaged by lightning or a power cross, it is best to install a protector. The above photograph shows an outdoor type telephone installed on a pole and fed from an underground cable. A substation protector also is provided.

★ ★ ★

CABLE TERMINAL MARKING: Some operating telephone companies lose time because workmen cannot quickly identify cable terminals and their counts. The above photograph shows a method whereby CA-104, 201-225, is stamped into the terminal cover. These markings also appear on all cable layout drawings.

Cable Drying Desiccant

By JOHN G. REYNOLDS

IN THE past, and up until a few years ago, it was the accepted practice in the telephone industry to dry moisture from cable splices by the "boiling out" plan, utilizing hot paraffin. This was accomplished by pouring the melted paraffin over the paper insulation. Although this method usually is effective, it has, however, the disadvantages of fire hazards, causes burns to workmen, generates objectionable fumes when used inside buildings and causes some damage to public relations when spilled or splashed on walls or floors.

The new and modern method of drying out paper insulated cables involves the use of a granular desiccant which is worked in around the conductors after the splicing has been accomplished and before wiping on the lead sleeve.

Extensive laboratory tests and field trials have been conducted for the purpose of developing a desiccant which practically is insoluble, nonacid and nonalkaline, in order that harmful effects are not produced upon either the copper conductors or the paper insulation of telephone cable.

Two desiccants now commonly used are anhydrous calcium sulphate and silica gel. Neither of these two desiccants has proved harmful to telephone cable.

Desiccant acts as a drawing agent with an absorption action, whereas hot paraffin is a driving agent. When cable splices are treated with desiccant, some attain a high insulation resistance quickly. Other splices require days or even weeks to reach required high insulation resistance values. This will depend, to a great extent, on whether the splicing takes place in a dry or in a wet, humid manhole.

The lagging insulation resistance recovery is not considered overly serious, however, for this will not affect the operation of ordinary telephone circuits. Even when splices are exposed to extreme humidity conditions for several days while being worked on, the insulation resistance ordinarily does not drop to values so low as to preclude circuit operations. Serious consequences might result if a cable contained a considerable number of highly humidified splices, but this would not be possible when the desiccant drying method is used. In this case, the splices could not be completed at one time and the first completed would reach high insulation values before other splices could be completed.

The speed with which a desiccant will dry a splice depends on the moisture present and conditions which affect the ease of absorption of the moisture from the insulation to the desiccant. For this reason, small splices usually dry faster than large ones. When a splice is wrapped tightly with muslin, its drying rate is slowed up considerably. Paraffined insulation or cotton sleeves release their moisture at a much slower rate than untreated insulation. There have been cases of record where weeks were required for paraffined cotton sleeves to release their moisture to the desiccant.

When paraffin is used for boiling out cable, it should be heated to 370 degrees F., and never higher than 390 degrees F. A dry dipper should be used in pouring the heated paraffin on a splice. The paraffin first should be poured on the lead sheath about six inches from the splice. When the sheath is well heated, work toward the center of the splice from each end. This action is necessary so that if there is any moisture under the sheath it will be driven out, and not further back into the cable. Paraffin must be poured on the splice, itself, until all traces of moisture are removed. The pouring should not be concentrated on any one point of the splice, but should proceed back and forth along the full length of the splice. On a large splice, such as a 400-pair cable, or larger, it is a good plan to boil out after about half of the conductors are spliced. If the splice is being made under unusually damp conditions, it should be boiled out at frequent intervals during the splicing operations. After the boiling out of the splice has been completed, it should be permitted to cool until it can be handled comfortably with the bare hands. The splice should be treated again with heated paraffin after the muslin wrapping has been applied. It also generally is considered desirable to boil out the muslin before wrapping the splice.

When desiccant is used for splice drying, the conductors are spliced in the usual manner. Next, a muslin envelope should be arranged to cover the splice and extended at least two inches over the lead sheath at each end. There should be an overlap of the envelope of at least one inch at the top, to permit entrance of the desiccant granules into the splice. The desiccant should be worked among the conductors by spreading them slightly with the fingers. The granules also should be worked well into the conductors at the ends of the muslin envelope and near the sheath butts. The envelope then is closed and wrapped securely with two wrappings of unboiled muslin bandage.

When a can of desiccant is opened on the job, the unused remaining portion should be discarded at the end of the day.

Two standard types of cable desiccants have been approved and now are in common use by telephone companies. These are described as follows:

(1) Anhydrous calcium sulphate manufactured by the W. A. Hammond Drierite Co., Yellow Springs, Ohio. This desiccant consists of irregular white granules, one-sixteenth of an inch in size. The manufacturer furnishes it in moistureproof sealed cans containing 50,200 and 800 grams of desiccant, respectively. This chemical will absorb approximately 6 per cent of its weight of water and still have zero vapor pressure. For example: If a pound of desiccant is sealed in a splice containing an ounce of water, all of the water would be absorbed and permanently held by the desiccant. If the splice contained more than an ounce of water, the pound of desiccant would absorb some, but not all of it.

(2) Silica gel manufactured and supplied by the Davison Chemical Corp., Baltimore, Md. The granules are composed of fine particles which resemble white sand. It is chemically inert and noncorrosive and will not dust, cake, powder or liquify when used. This desiccant has a high dielectric constant. It is furnished in 160 and 650-gram jars.

Moisture, even in small quantities, is most harmful in any type of paper insulated telephone cables. Regardless of the drying method used, it should be planned carefully and carried out in order that harmful moisture will be removed from the paper and proper insulation resistance provided.

LONG SPAN CONSTRUCTION

LONG SPAN construction in open wire communication lines has been made both possible and practicable by the development of high strength line wire. This evolution has opened up a new era of possibilities for improvement and expansion of rural line service. New engineering practices in design and construction of open wire lines has been made necessary since the advent of this new high strength wire. Span lengths have been increased with a corresponding reduction in the number of poles per mile. This has made possible a worthwhile reduction in the cost per mile of line.

Two types of wire, (1) high-tensile strength line wire and (2) Copperweld steel, are commonly used for long span construction in the telephone industry. The object of this article will be to furnish necessary technical information in order that new construction may be engineered so that it will be suitable to climatic conditions and provide essential transmission to meet specific requirements in any telephone exchange.

Due to the extra load and strain of long span construction, poles should be heavier and higher than those ordinarily used for conventional span lengths. Anchors, guys and corners also should be engineered so as to endure greater strains. Because of the higher vibration of the longer spans, special ties are considered necessary in order to hold the line wire to the insulators.

Prior to 1850, very little iron had been manufactured in this country. The earliest methods of protecting iron wire against corrosion consisted of coating it with boiled linseed oil or varnish. A more efficient preservative later was discovered in zinc, applied by the process known as galvanizing. Early experience led to the belief that iron wire of the purest and softest quality made the most efficient line conductors. The best material then known was Swedish iron, imported to this country in billets for drawing into wire.

Later, commercial grades of galvanized iron wire were established which came to be known by certain trade names. These grades were designated by the names, Extra Best Best (EBB), Best Best (BB) and steel. The first grade, or EB, had the highest electrical conductivity, BB was the second in quality and steel was lowest. In tensile strength, however, EBB was lowest, BB was next and steel was highest.

The Indiana Steel & Wire Co. was the pioneer organization in planning and executing research to improve the electrical and mechanical properties of galvanized iron and steel wires, for use on overhead open wire communication lines. This research was started about 1916 and was directed towards a fundamental exploration of the electrical, magnetic, physical and chemical properties of these conductors, with a view to improving their over-all efficiency for electrical communication.

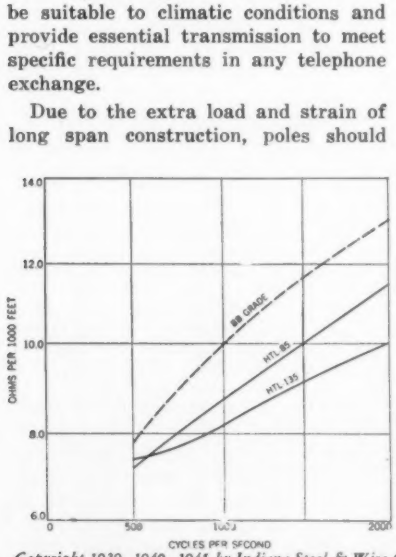


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FIG. 1

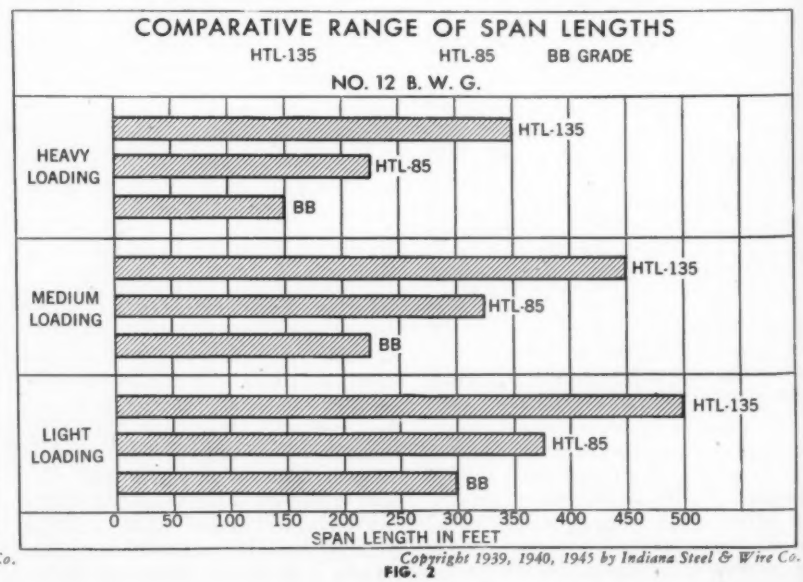

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FIG. 2

It was discovered, through these researches, that the carbon in steel is the most important single element which controls its magnetic permeability. Carbon is also the most important element which controls tensile strength. Conducted experiments developed the fact that a certain amount of carbon was required to depress the permeability and the skin effect at audio frequencies. Ultimately, it was found possible to make a type of carbon-steel line wire, not previously known in the art, which provided a more efficient and stronger telephone line conductor.

During this research and development, the electrical properties of ferrous line were carefully investigated over the usual range of audio frequencies, from a few hundred cycles per second to several thousand cycles per second. One of the important characteristics of this new steel wire is the fact that its effective resistance to alternating currents of telephonic magnitude is relatively less in the higher range of audio frequencies than the resistance of the best grades of iron wire.

This extensive research has brought to the telephone industry two new ferrous wires which are known as HTL-85 and HTL-135 line wire. The stronger grade is the HTL-135 which is especially adapted for long span lines at low cost. The other grade, HTL-85, is for use on medium long spans for exchange and rural use. The minimum breaking load of HTL-135 is approximately 165 per cent greater than that of BB iron wire, and HTL-85 is 67 per cent greater for the same grade of iron wire.

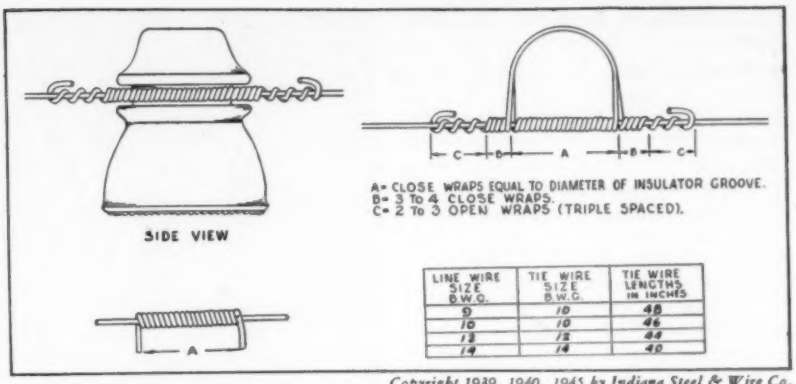
HTL-135 telephone line wire is furnished in one size, No. 12 BWG, and in continuous lengths, without splices or joints. The characteristics of this wire are as follows:

Size BWG	No. 12
Nominal diameter in ins.	0.109
Min. breaking strength (lbs.)	1213
Resistance per mi. (ohms)	38.23
Approx. weight per mi. (lbs.)	170

The HTL-85 telephone line wire is furnished in four standard sizes, as follows:

Size BWG	Nominal Diameter in Ins.	Approx. Weight in lbs. per Mi.	Approx. Coil Length (Mi.)	Min. Breaking Load in lbs.	Max. Resistance in Ohms per Mi.
9	0.148	314	½	1462	18.47
10	0.134	258	½	1199	22.48
12	0.109	170	½	793	34.12
14	0.083	99	½	460	58.59

Telephone transmission losses expressed in decibels per mile for metallic circuits have been determined for HTL-135 telephone wire after extensive tests. These tests were made at 1,000 cycles per second with currents of normal voice frequency magnitude. For comparison, similar tests were made on BB telephone wire. Average results indicate that HTL-135 has approximately 5 per cent lower transmission loss per mile than BB wire. Similar tests made on HTL-85 indicate that it has approximately the same transmission efficiency as the HTL-135 wire.



LINE WIRE SIZE B.W.G.	TIE WIRE SIZE B.W.G.	TIE WIRE LENGTHS IN INCHES
9	10	48
10	10	46
13	13	44
14	14	40

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FIG. 3

Comparative measurements of AC resistance of No. 12 BWG telephone wires in the audio-frequency range, with currents of telephonic magnitude are shown in the graph in *Fig. 1.* It will be noted that the resistance of HTL-135 does not increase proportionately as much at the higher frequencies as does that of BB wire and, consequently, HTL-135 has considerably lower modulating effect on voice currents. The graph also shows that HTL-85 wire has an advantage over BB wire in this respect.

Fig. 2 indicates comparative range of span length for HTL-135, HTL-85 and BB wire. Obviously, either HTL-135, or HTL-85 telephone line wire is entirely suitable for use in ranges shorter than shown for each type in the table, and such use will make the

STANDARDS FOR VARIOUS WIRE GAUGES IN USE IN THE UNITED STATES

(Dimensions of sizes in decimal parts of an inch)

Wire Gauge No.	American or Brown & Sharpe Co.	Birmingham, or Stubs iron wire	Washburn & Moen Mfg. Co. or Roebling	English legal Standard
(1)	(2)	(3)	(4)	(5)
0000	0.46	.4540	0.3938	.400
000	.40964	.425	.3625	.372
00	.3648	.38	.3310	.348
0	.32486	.34	.3065	.324
1	.2893	.3	.2830	.300
2	.25763	.284	.2625	.276
3	.22942	.259	.2437	.252
4	.20431	.238	.2253	.232
5	.18194	.22	.2070	.212
6	.16202	.203	.1920	.192
7	.14428	.18	.1770	.176
8	.12849	.165	.1620	.160
9	.11443	.148	.1483	.144
10	.10189	.134	.1350	.128
11	.090742	.12	.1205	.116
12	.080808	.109	.1055	.104
13	.071961	.095	.0915	.092
14	.064084	.083	.0800	.080
15	.057068	.072	.0720	.072
16	.05082	.065	.0625	.064
17	.045257	.058	.0540	.056
18	.040303	.049	.0475	.048
19	.03589	.042	.0410	.040
20	.031961	.035	.0348	.036
21	.028462	.032	.03175	.032
22	.025347	.028	.0286	.028
23	.022571	.025	.0258	.024
24	.0201	.022	.0230	.022
25	.0179	.02	.0204	.020
26	.01594	.018	.0181	.018
27	.014195	.016	.0173	.0164
28	.012641	.014	.0162	.0149

spans capable of supporting increased loads.

Stringing sags for HTL-135 and HTL-85 are shown in *Tables 1 to 9* on pages 28 to 31. There are special situations in which the construction of telephone lines is governed by requirements of the National Electric Safety Code, or, in some cases, by state codes. When communication lines are in hazardous proximity to power lines, as in the case of crossings, conflicts overbuilding, and joint use, the rules of the National Electrical Safety Code always should govern, or the equivalent rules of state codes, where applicable. These rules are applicable also to crossings over railroad tracks.

For span lengths of 200 ft. and over, it is recommended that consideration be given to reinforcing the line wire at the supports as indicated in *Fig. 3*. This armor type of tie has a number of advantages, such as:

(1) It tends to stiffen the line wire in the groove of the insulator and affords improved distribution of line wire stresses at the support.

(2) The tie wire acts as an armor over the line wire and protects it against abrasion caused by vibration and swaying.

(3) During the periods of ice and wind loading the armor tie secures the line wire more firmly to the insulator.

General loading map showing territorial division of the United States with respect to loading of overhead lines. Three general degrees of loading due to weather conditions are recognized and are designated as heavy, medium and light loading. The map above shows the districts in the United States in which these loadings are normally applicable. This map is reproduced from Section 25 of the Fifth Edition of the National Electrical Safety Code, which is published as National Bureau of Standards Handbook H32.

Data and tables concerning the use of Copperweld wire for long span construction begin on page 32.

Stringing Sags for HTL-135 Telephone Wire (No. 12 B.W.G.)

TABLE 1—Long Spans in Heavy Loading Districts

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
200	15.0	14.0	13.0	12.5	11.5	11.0	10.0	9.5	9.5	9.0	8.0	7.5
210	16.5	15.5	14.5	13.5	12.5	12.0	11.0	10.5	10.0	9.5	9.0	8.5
220	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.5	11.0	10.5	10.0	9.5
230	19.5	18.5	17.5	16.0	15.0	14.0	13.5	13.0	12.0	11.5	10.5	10.0
240	21.5	20.0	19.0	17.5	16.5	15.5	14.5	14.0	13.0	12.5	11.5	11.0
250	23.0	21.5	20.5	19.0	18.0	16.5	15.5	15.0	14.0	13.5	12.5	12.0
260	25.0	23.5	22.0	21.0	19.5	18.0	17.0	16.0	15.0	14.5	13.5	13.0
270	27.0	25.5	24.0	22.5	21.0	19.5	18.5	17.5	16.5	15.5	15.0	14.0
280	29.0	27.5	25.5	24.0	22.5	21.0	19.5	18.5	17.5	16.5	16.0	15.0
290	31.5	29.5	27.5	26.0	24.0	22.5	21.0	20.0	19.0	18.0	17.0	16.0
300	33.5	31.5	29.5	28.0	26.0	24.0	22.5	21.5	20.5	19.5	18.5	17.5
310	35.5	33.5	31.5	29.5	27.5	26.0	24.0	23.0	21.5	20.5	19.5	18.5
320	38.0	35.5	33.5	31.5	29.5	27.5	26.0	24.5	23.0	22.0	20.5	19.5
330	40.5	38.0	35.5	33.0	31.0	28.5	27.5	26.0	24.5	23.5	22.0	21.0
340	43.0	40.5	37.5	35.0	33.0	31.0	29.0	27.5	26.0	24.5	23.5	22.0
350	45.5	43.0	40.0	37.5	35.0	33.0	31.0	29.0	27.5	26.0	25.0	23.5

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-fifth of the rated breaking strength of HTL-135 Wire, for all span lengths shown above.

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Stringing Sags for HTL-135 Telephone Wire (No. 12 B.W.G.)

TABLE 2—Long Spans in Medium Loading Districts

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	110°	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°
	— Sags in Inches —											
300	28.0	25.5	24.5	22.5	21.5	20.0	19.0	18.0	17.0	16.0	15.5	15.0
310	30.0	27.5	26.0	24.0	23.0	21.5	20.5	19.0	18.5	17.5	17.0	16.0
320	32.0	29.0	27.5	26.0	24.0	23.0	21.5	20.5	19.5	18.5	18.0	17.0
330	34.0	31.0	29.5	27.5	26.0	24.5	23.0	21.5	20.5	19.5	19.0	18.5
340	36.0	33.0	31.0	29.0	27.5	26.0	24.5	23.0	22.0	21.0	20.0	19.5
350	38.0	35.0	33.0	31.0	29.0	27.5	26.0	24.5	23.5	22.0	21.5	20.5
360	40.5	37.0	35.0	33.0	31.0	29.0	27.5	26.0	24.5	23.5	22.5	21.5
370	43.0	39.0	37.0	34.5	32.5	31.0	29.0	27.5	26.0	25.0	24.0	23.0
380	45.0	41.0	39.0	36.5	34.0	32.5	30.5	29.0	27.5	26.0	25.5	24.5
390	47.5	43.5	41.0	38.5	36.0	34.0	32.0	30.5	29.0	27.5	26.5	25.5
400	50.0	45.5	43.0	40.5	38.0	36.0	34.0	32.0	30.5	29.0	28.0	27.0
410	52.5	48.0	45.0	42.5	40.0	38.0	36.0	33.5	32.0	30.5	29.5	28.5
420	55.0	50.0	47.5	44.5	42.0	40.0	37.5	35.5	33.5	32.0	31.0	30.0
430	58.0	52.5	50.0	47.0	44.0	42.0	39.5	37.0	35.5	33.5	32.5	31.0
440	60.5	55.0	52.0	49.0	46.0	43.5	41.0	39.0	37.0	35.0	34.0	32.5
450	63.0	57.5	54.5	51.0	48.0	45.5	43.0	40.5	38.5	36.5	35.5	34.0

These sags are such that the unloaded tensions at zero degrees fahrenheit equal approximately one-fifth of the rated breaking strength of HTL-135 Wire, for all span lengths shown above.

TABLE 3—Long Spans in Light Loading Districts

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	110°	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°
	— Sags in Inches —											
350	35.0	32.0	30.0	28.0	26.5	25.0	23.5	22.5	21.0	20.0	19.5	19.0
360	37.0	33.5	31.5	30.0	28.0	26.5	25.0	23.5	22.5	21.5	21.0	20.0
370	39.0	35.5	33.5	31.5	29.5	28.0	26.5	24.5	23.5	22.5	22.0	21.0
380	41.0	37.5	35.0	33.0	31.0	29.5	28.0	26.5	25.0	24.0	23.0	22.0
390	43.0	39.5	37.0	35.0	33.0	31.0	29.5	27.5	26.0	25.0	24.0	23.5
400	45.5	41.5	39.0	36.5	34.5	32.5	31.0	29.0	27.5	26.5	25.5	24.5
410	47.5	43.5	41.0	38.5	36.5	34.5	32.5	30.5	29.0	28.0	27.0	26.0
420	50.0	46.0	43.0	40.5	38.0	36.0	34.0	32.0	30.5	29.0	28.0	27.0
430	52.5	48.0	45.0	42.5	40.0	38.0	35.5	33.5	32.0	30.5	29.5	28.5
440	55.0	50.0	47.0	44.5	42.0	40.0	37.5	35.5	33.5	32.0	30.5	29.5
450	57.5	52.5	49.5	46.5	44.0	41.5	39.0	37.0	35.5	33.5	32.0	31.0
460	60.0	55.0	51.5	48.5	46.0	43.5	41.0	38.5	37.0	35.0	33.5	32.5
470	62.5	57.5	54.0	50.5	48.5	45.5	43.0	40.5	38.5	36.5	35.0	34.0
480	65.5	60.0	56.0	53.0	50.0	47.5	44.5	42.0	40.0	38.0	36.5	35.5
490	68.0	62.5	58.5	55.0	52.0	49.5	46.5	44.0	42.0	39.5	38.0	37.0
500	71.0	65.0	61.0	57.5	54.5	51.5	48.5	45.5	43.5	41.0	39.5	38.5

These sags are such that the unloaded tensions at zero degrees fahrenheit equal approximately one-fourth of the rated breaking strength of HTL-135 Wire, for all span lengths shown above.

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Stringing Sags for HTL-85 Telephone Wire (No. 12 B.W.G.)

TABLE 4—Heavy Loading Districts—Long Spans from 125 to 225 Feet

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
125	13.0	12.0	11.0	10.0	9.5	8.5	7.5	7.0	6.5	6.0	5.5	5.0
130	14.0	13.0	12.0	11.0	10.0	9.0	8.0	7.5	7.0	6.5	6.0	5.5
140	16.0	15.0	14.0	12.5	11.5	10.5	9.5	9.0	8.0	7.5	7.0	6.5
150	18.5	17.0	16.0	14.5	13.0	12.0	11.0	10.0	9.0	8.5	7.5	7.0
160	21.0	19.5	18.0	16.0	15.0	14.0	12.5	11.5	10.5	9.5	9.0	8.0
170	23.5	22.0	20.5	18.5	17.0	15.5	14.0	13.0	12.0	11.0	10.0	9.5
180	26.5	24.5	23.0	20.5	19.0	17.5	15.5	14.5	13.0	12.0	11.0	10.5
190	29.5	27.0	25.5	23.0	21.0	19.5	17.0	16.0	14.5	13.5	12.0	11.5
200	33.0	30.0	28.5	25.5	23.5	21.5	19.0	18.0	16.0	15.0	13.5	13.0
210	36.0	33.0	31.5	28.0	26.0	23.5	21.0	19.5	17.5	16.5	15.0	14.5
220	39.5	36.5	34.0	30.5	28.5	26.0	23.5	21.5	19.5	18.0	16.5	15.5
225	41.5	38.0	35.5	32.5	30.0	27.0	25.0	23.0	21.0	19.0	17.5	16.5

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-fifth of the rated breaking strength of HTL-85 Wire, for all span lengths shown above.

TABLE 5—Medium Loading Districts—Long Spans from 200 to 325 Feet

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
200	25.0	23.5	22.0	20.5	19.0	17.5	16.5	15.0	14.0	13.0	12.0	11.5
210	27.5	26.0	24.0	22.5	21.0	19.5	18.0	16.5	15.5	14.5	13.5	13.0
220	30.0	28.5	26.5	25.0	23.0	21.5	20.0	18.5	17.0	16.0	15.0	14.0
230	33.0	31.0	29.0	27.0	25.0	23.5	21.5	20.0	18.5	17.5	16.0	15.0
240	36.0	33.5	31.5	29.5	27.0	25.5	23.5	21.5	20.5	19.0	17.5	16.5
250	39.0	36.5	34.0	32.0	29.5	27.5	25.5	23.5	22.0	20.5	19.0	18.0
260	42.0	39.5	37.0	34.5	32.0	29.5	27.5	25.5	24.0	22.0	20.5	19.5
270	45.5	42.5	39.5	37.5	34.5	32.0	30.0	27.5	25.5	24.0	22.0	21.0
280	49.0	45.5	42.5	40.0	37.0	34.5	32.0	29.5	27.5	25.5	24.0	22.5
290	52.5	49.0	46.0	43.0	39.5	37.0	34.5	32.0	29.5	27.5	25.5	24.0
300	56.0	52.5	49.0	46.0	42.5	39.5	36.5	33.5	32.0	29.5	27.5	26.0
310	60.0	56.0	52.5	49.5	45.5	42.5	39.0	36.0	34.0	31.5	29.0	27.5
320	64.0	60.0	56.0	52.5	49.5	45.0	42.0	38.5	36.0	33.5	31.0	29.5
325	66.0	62.0	58.0	54.5	51.5	47.5	44.0	40.5	37.0	34.5	32.0	30.5

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-fifth of the rated breaking strength of HTL-85 Wire, for all span lengths shown above.

TABLE 6—Light Loading Districts—Long Spans from 275 to 375 Feet

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
275	40.0	37.5	35.0	32.0	30.5	28.0	26.0	24.0	22.5	21.0	19.5	18.5
280	41.5	39.0	36.5	33.5	31.5	29.0	27.0	25.0	23.5	22.0	20.5	19.0
290	44.5	41.5	39.0	36.5	34.0	31.5	29.0	27.0	25.0	23.5	22.0	20.5
300	47.5	44.5	41.5	38.5	36.0	33.5	31.0	29.0	27.0	25.0	23.5	22.0
310	51.0	47.5	44.5	41.5	38.5	36.0	33.0	31.0	28.5	26.5	25.0	23.5
320	54.0	50.5	47.5	44.5	41.5	38.5	35.5	33.0	30.5	28.5	26.5	25.0
330	57.5	54.0	50.5	47.0	44.0	41.0	37.5	35.0	32.5	30.5	28.5	26.5
340	61.0	57.5	53.5	50.0	46.5	43.5	40.0	37.0	34.5	32.0	30.0	28.0
350	64.5	60.5	56.5	53.0	49.0	46.0	42.5	39.5	36.5	34.0	32.0	30.0
360	68.5	64.0	60.0	56.0	52.0	48.5	45.0	42.0	39.0	36.5	34.0	32.0
370	72.0	67.5	63.5	59.0	55.0	51.0	47.5	44.5	41.0	38.5	36.0	33.5
375	74.0	69.5	65.0	60.5	56.5	52.5	48.5	45.5	42.0	39.0	36.5	34.0

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-fourth of the rated breaking strength of HTL-85 Wire, for all span lengths shown above.

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Stringing Sags for HTL-85 Telephone Wire (No. 12 B.W.G.)

TABLE 7—Heavy Loading Districts—Span Lengths from 100 to 150 Feet In Same Spans with Galvanized B.B. and Hard Drawn Copper Wires

(May also be used in Medium and Light Loading Districts)

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
100	9.5	8.5	7.5	6.5	6.0	5.5	5.0	4.0	4.0	3.5	3.5	3.0
110	11.5	10.0	9.0	8.0	7.0	6.5	6.0	5.0	5.0	4.5	4.0	3.5
120	13.5	12.0	10.5	9.5	8.5	7.5	7.0	6.0	5.5	5.0	4.5	4.5
130	16.0	14.0	12.5	11.5	10.0	9.0	8.5	7.0	6.5	6.0	5.5	5.0
140	18.5	16.5	14.5	13.0	11.5	10.5	9.5	8.5	7.5	7.0	6.5	6.0
150	21.5	19.0	17.0	15.0	13.0	12.0	11.0	10.0	9.0	8.0	7.5	7.0

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-third of the rated breaking strength of BB Wire, for all span lengths shown above.

TABLE 8—Medium Loading Districts—Span Lengths from 151 to 225 Feet In Same Spans with Galvanized B.B. and Hard Drawn Copper Wires

(May also be used in Light Loading Districts)

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
151	18.5	17.0	16.0	14.5	13.0	12.0	11.0	10.0	9.0	8.5	7.5	7.0
160	21.0	19.5	18.0	16.0	15.0	14.0	12.5	11.5	10.5	9.5	9.0	8.0
170	23.5	22.0	20.5	18.5	17.0	15.5	14.0	13.0	12.0	11.0	10.0	9.5
180	26.5	24.5	23.0	20.5	19.0	17.5	15.5	14.5	13.0	12.0	11.0	10.5
190	29.5	27.0	25.5	23.0	21.0	19.5	17.0	16.0	14.5	13.5	12.0	11.5
200	33.0	30.0	28.5	25.5	23.5	21.5	19.0	18.0	16.0	15.0	13.5	13.0
210	36.0	33.0	31.5	28.0	26.0	23.5	21.0	19.5	17.5	16.5	15.0	14.5
220	39.5	36.5	34.0	30.5	28.5	26.0	23.5	21.5	19.5	18.0	16.5	15.5
225	41.5	38.0	35.5	32.5	30.0	27.0	25.0	23.0	21.0	19.0	17.5	16.5

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-third of the rated breaking strength of BB Wire, for all span lengths shown above.

TABLE 9—Light Loading Districts—Span Lengths from 226 to 300 Feet In Same Spans with Galvanized B.B. and Hard Drawn Copper Wires

Span Length (Feet)	Temperatures in Degrees Fahrenheit											
	100°	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°	-10°
	— Sags in Inches —											
226	31.5	29.5	27.5	26.0	24.0	22.5	21.0	19.0	17.5	16.5	15.5	14.5
230	33.0	31.0	29.0	27.0	25.0	23.5	21.5	20.0	18.5	17.5	16.0	15.0
240	36.0	33.5	31.5	29.5	27.0	25.5	23.5	21.5	20.5	19.0	17.5	16.5
250	39.0	36.5	34.0	32.0	29.5	27.5	25.5	23.5	22.0	20.5	19.0	18.0
260	42.0	39.5	37.0	34.5	32.0	29.5	27.5	25.5	24.0	22.0	20.5	19.5
270	45.5	42.5	39.5	37.5	34.5	32.0	30.0	27.5	25.5	24.0	22.0	21.0
280	49.0	45.5	42.5	40.0	37.0	34.5	32.0	29.5	27.5	25.5	24.0	22.5
290	52.5	49.0	46.0	43.0	39.5	37.0	34.5	32.0	29.5	27.5	25.5	24.0
300	56.0	52.5	49.0	46.0	42.5	39.5	36.5	33.5	32.0	29.5	27.5	26.0

These sags are such that the unloaded tensions at minus 10 degrees fahrenheit equal approximately one-third of the rated breaking strength of BB Wire, for all span lengths shown above.

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Copperweld communication wires have from two to 2½ times the strength of hard drawn copper wire. The strength is obtained from the inner steel core and, as the electrical properties of Copperweld wire are determined almost entirely by the outer copper, the type of steel is not limited by electrical considerations. The steel is especially selected to meet the mechanical requirements of overhead telephone lines.

The thick welded-on covering of copper gives Copperweld the permanence and long life of a copper conductor. Copperweld telephone wire is guaranteed to have the same rust-resisting life as solid copper wire of equal diameter when used under similar exposure conditions.

Copperweld has a high electrical conductance, being either 30 or 40 per cent that of a copper conductor. This conductance is in the copper exterior of the wire. Electrically, it provides a tubular type of conductor which is not affected by the inner steel core and the electrical performance is similar to a tubular copper conductor of equal diameter and copper content. The resistance at telephone frequencies is only slightly higher than the direct current resistance. Also, the variation in resistance over the range of telephone frequencies is small, which provides excellent voice transmission.

These electrical properties of Copperweld wire are even more evident at the higher frequencies such as used on carrier systems. The skin effect is very small, and, at these high frequencies, the electrical conductance approaches that of copper wire of similar diameter. Another advantage claimed of Copperweld for carrier currents is that it can be strung with small sags, permitting close conductor spacing. Copperweld conductors are particularly well adapted for all high frequency systems.

FIG. 4

Even though Copperweld is high in strength, it is pliable and easy to handle. The special alloy steel from which Copperweld wire is made has been selected to provide strength without spring-like characteristics usually found in steel wires.

Copperweld is especially suited for use on long spans as its provides safety and reliability of the more expensive short span construction with the operating advantages of long spans. It is applicable for all types of communication lines from the most important grades of construction, where safety and reliability are the main requisites, to the lightest types of lines, where the very lowest initial cost is essential.

Engineering information on which line design may be based is shown in *Tables 10 to 15* on pages 32, 33, 34, 35.

Copperweld Grip-Flex ties provide an improved method of securing conductors to insulators which is adapted to long span construction. This tie is simple in design, easy to apply and provides a high strength job. It is uniform and eliminates the more common faults of hand wrapped ties which have been the cause of chafing and fatigue fracturing of conductors.

The Grip-Flex tie holds the conductor secure to the insulator and also reinforces the conductor over the length of the tie. This design is based on having the reinforcing portion of the tie placed on the conductor as a separate unit from the binding to the insulator. The reinforcing portion is made of hard-drawn Copperweld wire and extends over the full length of the tie. It is performed in a helical shape so as to make a tight, snug fit on the conductor. The securing of the conductor to the insulator is made with a simple binding of annealed Copperweld wire, which is pliable, has high strength and is easy to apply. The completed tie is shown in *Fig. 4*.

TABLE 10—WET WEATHER ATTENUATION OF 40% CONDUCTIVITY COPPERWELD PAIRS

Estimated at 68° F. and 53 pairs of CS insulators per mile

Frequency Kilocycles per Second	165 Mil Wire with Uniform Spacing of:			128 Mil Wire with Uniform Spacing of:			104 Mil Wire with Uniform Spacing of:		
	6 in.	8 in.	12 in.	6 in.	8 in.	12 in.	6 in.	8 in.	12 in.
0.2	.0649	.063	.0600	.0872	.084	.081	.108	.105	.101
0.5	.0799	.076	.0721	.114	.110	.104	.148	.142	.136
1.0	.0884	.084	.0783	.132	.126	.119	.177	.169	.160
1.5	.0919	.087	.0815	.138	.133	.124	.190	.181	.170
2.0	.0939	.089	.0832	.144	.137	.128	.198	.188	.176
2.5	.0956	.091	.0847	.147	.140	.130	.203	.193	.181
3.0	.0971	.092	.0863	.149	.142	.132	.206	.196	.183
4.0	.100	.095	.0889	.151	.144	.134	.210	.200	.187
5.0	.102	.097	.0907	.155	.148	.137	.214	.205	.190
10.	.109	.104	.0976	.163	.155	.145	.226	.215	.200
20.	.120	.115	.107	.174	.166	.155	.239	.228	.212
30.	.132	.127	.120	.185	.177	.168	.249	.238	.224
40.	.145	.140	.133	.196	.188	.178	.259	.249	.233
50.	.158	.153	.147	.206	.199	.190	.271	.261	.247
60.	.173	.168	.161	.219	.212	.202	.282	.271	.257
70.	.189	.183	.177	.232	.224	.215	.293	.283	.270
80.	.204	.198	.190	.246	.238	.228	.304	.294	.279
90.	.218	.212	.205	.259	.251	.242	.316	.305	.293
100.	.234	.227	.219	.273	.265	.254	.327	.317	.303
110.	.249	.242	.234	.287	.279	.269	.339	.329	.317
120.	.263	.255	.246	.301	.293	.282	.351	.341	.327
130.	.277	.269	.261	.316	.307	.297	.365	.354	.342
140.	.290	.282	.273	.330	.321	.310	.378	.367	.353
150.	.303	.295	.285	.345	.336	.324	.393	.382	.367

NOTE: For DP insulators the attenuation change from dry to wet weather conditions is about twice that for CS insulators.

TABLE 11—DRY WEATHER ATTENUATION OF 40% CONDUCTIVITY COPPERWELD PAIRS

Estimated for 68° F. and 53 pairs of CS insulators per mile

Frequency Kilocycles per Second	Attenuation—db per Mile								
	165 Mil Wire with Uniform Spacing of:			128 Mil Wire with Uniform Spacing of:			104 Mil Wire with Uniform Spacing of:		
	6 in.	8 in.	12 in.	6 in.	8 in.	12 in.	6 in.	8 in.	12 in.
0.2	.0591	.0566	.0536	.0794	.0765	.0729	.0988	.0955	.0914
0.5	.0748	.0708	.0665	.108	.103	.0972	.140	.134	.127
1.0	.0832	.0784	.0729	.126	.120	.112	.169	.162	.152
1.5	.0867	.0815	.0756	.134	.127	.118	.182	.174	.162
2.0	.0884	.0830	.0768	.137	.130	.120	.190	.180	.168
2.5	.0898	.0842	.0780	.140	.132	.122	.195	.185	.172
3.0	.0909	.0852	.0790	.142	.134	.124	.197	.188	.174
4.0	.0929	.0871	.0807	.143	.136	.125	.201	.192	.177
5.0	.0942	.0883	.0818	.146	.138	.127	.204	.195	.179
10.	.0975	.0915	.0847	.150	.142	.131	.212	.201	.186
20.	.103	.0964	.0884	.156	.147	.135	.219	.207	.191
30.	.109	.103	.0950	.160	.152	.139	.223	.211	.195
40.	.118	.111	.102	.166	.157	.145	.227	.216	.201
50.	.126	.119	.110	.172	.163	.150	.234	.221	.206
60.	.136	.128	.119	.180	.170	.157	.240	.227	.211
70.	.147	.138	.129	.187	.177	.165	.246	.233	.217
80.	.158	.148	.138	.197	.186	.173	.252	.239	.222
90.	.168	.158	.147	.205	.194	.180	.259	.245	.228
100.	.179	.168	.156	.214	.203	.188	.266	.252	.234
110.	.189	.178	.166	.224	.212	.197	.273	.259	.241
120.	.199	.188	.174	.234	.222	.206	.281	.266	.248
130.	.209	.197	.184	.244	.231	.215	.290	.275	.256
140.	.219	.207	.192	.255	.241	.224	.299	.284	.264
150.	.228	.214	.199	.265	.251	.233	.309	.293	.273

NOTE: These values may be used for DP insulators.

TABLE 12—LONG SPANS—250 to 500 FEET. Stringing Sag in Inches

Span Length Feet	Temp. °F.	Temp. 30°F	Temp. 60°F.	Temp. 90°F.	Temp. 120°F.
250	11.0	13.0	16.0	19.0	24.0
300	16.0	19.0	22.0	27.0	33.0
350	22.0	26.0	30.5	36.0	43.5
400	29.0	34.0	40.0	47.0	55.0
450	37.5	43.0	50.0	58.0	68.0
500	47.0	54.0	62.0	71.0	82.0

Stringing Tension in Pounds. Corresponding to above Stringing Sags

Temp. °F.	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
0	376	301	248	248	239	150
30	324	259	214	214	205	129
60	274	219	181	181	174	109
90	231	184	152	152	146	92
120	193	155	128	128	123	77

Storm Load Capacity—in Pounds per foot at 0°F. Maximum Conductor Tension, 60% Rated Breaking Load of 40% Conductivity Copperweld Wire.

Span Length Feet	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
250	0.89	0.76	0.82	0.67	0.65	0.48
300	0.74	0.63	0.69	0.56	0.54	0.40
350	0.63	0.54	0.59	0.48	0.46	0.34
400	0.55	0.47	0.51	0.42	0.40	0.30
450	0.48	0.42	0.46	0.37	0.35	0.27
500	0.44	0.38	0.41	0.34	0.32	0.24

NOTE: These tables are based on usual stringing practices for telephone conductors. The sags are neither maximum nor minimum and considerable latitude is permissible to meet local conditions or the requirements of existing construction.

The following assumed storm loadings are representative of usual telephone construction practice: Heavy loading .5 lb. per foot, medium loading .3 lb. per foot, light loading .1 lb. per foot. These can be modified to conform to the particular line.

For the higher grades of construction where National Electrical Safety Code loadings apply the storm loadings for telephone wires are approximately as follows: Heavy loading .8 lb. per foot, medium loading .4 lb. per foot, light loading .1 lb. per foot. Exact loading may be obtained from Copperweld Wire Tables E.D.1800 by subtracting the weight of the bare conductor from the total loaded weight.

TABLE 13—MEDIUM SPANS—160 to 280 FEET. Stringing Sag in Inches

Span Length Feet	Temp. °F.	Temp. 30°F.	Temp. 60°F.	Temp. 90°F.	Temp. 120°F.
160	6.0	8.0	10.5	14.0	19.0
180	8.0	10.5	13.5	17.5	22.5
200	10.0	13.0	16.5	21.5	27.0
220	12.5	15.5	20.0	25.5	31.5
240	15.0	19.0	24.5	29.5	36.0
260	18.0	22.5	28.0	34.5	41.0
280	20.5	26.5	32.5	39.0	46.5

Stringing Tension in Pounds. Corresponding to above Stringing Sags

Temp. °F.	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
0	261	208	172	172	165	104
30	209	168	138	138	132	83
60	166	132	109	109	105	66
90	130	104	86	86	82	52
120	105	84	69	69	66	42

Storm Load Capacity—in Pounds per foot at 0°F. Maximum Conductor Tension, 60% Rated Breaking Load of 40% Conductivity Copperweld Wire

Span Length Feet	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
160	1.53	1.30	1.39	1.15	1.11	0.81
180	1.36	1.16	1.23	1.02	0.98	0.72
200	1.22	1.04	1.11	0.92	0.88	0.65
220	1.11	0.95	1.01	0.84	0.80	0.59
240	1.02	0.87	0.93	0.77	0.73	0.54
260	0.95	0.81	0.86	0.71	0.68	0.50
280	0.89	0.75	0.80	0.66	0.63	0.47

(See note in Table 12.)

TABLE 14—SHORT SPANS—80 to 180 FEET. Stringing Sag in Inches

Span Length Feet	Temp. 0°F.	Temp. 30°F.	Temp. 60°F.	Temp. 90°F.	Temp. 120°F.
80	2.0	2.5	4.0	6.0	9.0
100	3.0	4.0	5.5	8.5	12.0
120	4.5	6.0	8.0	12.0	16.0
140	6.0	8.0	11.5	15.5	20.0
160	8.5	11.0	14.5	19.5	24.5
180	11.0	14.0	18.5	24.0	29.0

Stringing Tension in Pounds. Corresponding to above Stringing Sags

Temp. °F.	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
0	221	176	146	146	139	88
30	166	132	109	109	105	66
60	118	94	78	78	75	47
90	84	67	55	55	53	33
120	63	51	42	42	40	25

Storm Load Capacity—in Pounds per foot at 0°F. Maximum Conductor Tension, 60% Rated Breaking Load of 40% Conductivity Copperweld Wire

Span Length Feet	No. 8 AWG (.128)	No. 9 AWG (.114)	E.H.S. (.104)	H.S. (.104)	No. 10 AWG (.102)	"12-40" (.081)
80	3.17	2.70	2.85	2.37	2.28	1.67
100	2.54	2.16	2.28	1.90	1.82	1.34
120	2.12	1.80	1.90	1.58	1.52	1.11
140	1.82	1.54	1.64	1.36	1.30	0.96
160	1.59	1.35	1.43	1.20	1.14	0.84
180	1.43	1.21	1.28	1.07	1.02	0.75

(See note in Table 12.)

TABLE 15—CHARACTERISTICS OF COPPERWELD COMMUNICATION CONDUCTORS

Size Inches	Breaking Load (Lbs.) High Strength 40% Cond.	High Strength 30% Cond.	Extra High Strength 40% Cond.	Extra High Strength 30% Cond.	Weight Lbs. per Mile	Resistance Ohms/1000 ft. at 68° F. 40% Cond.	Resistance Ohms/1000 ft. at 68° F. 30% Cond.	Transmission Equivalent Decibels (db) Loop Mile 35 DP insulators 12″ spacing—1000 cps. 40% Cond. Dry	40% Cond. Wet	30% Cond. Dry	30% Cond. Wet	Approx. Miles of Line Equivalent to 20 db loss 40% Cond.	30% Cond.
.165	2523	2780		3368	398.9	.9715	1.295	.071	.075	.093	.097	280	215
.128	1647	1802		2188	240.1	1.614	2.152	.107	.111	.135	.140	185	150
.104	1177	1283	1325		158.5	2.445	3.260	.144	.152	.182	.188	140	110
.080	770				93.77	4.133		.213	.219			95	

★ ★ ★ ★

COMMERCIAL MANAGER FINDS "A RAY OF HOPE"

From out of the day's mail, bringing the usual run of complaints and criticisms regarding slow installation of telephone service, W. A. Dickinson, general commercial manager of the Tri-County Telephone Co., South Haven, Mich., recently received a letter that proved that the unusual does happen. The letter from a non-subscriber, Mrs. Violet C. Cross, Paw-Paw, Mich., and the reply of Mr. Dickinson are reprinted below:

MRS. CROSS WROTE

"As we have no telephone and my brother-in-law living a half-mile distant as he does, we—my husband and I—have been in the habit of using theirs when we needed that kind of service; but said brother-in-law says *it isn't being strictly honest to use another's telephone without paying even for a local call*—says it is actually cheating the telephone company since we have not paid for the privilege.

"Of course we have always paid the fee charged for long distance calls but local calls—well we figured it was all between the one whose telephone we used and us. But his contention puts a different complexion on the subject and since I have a real desire to be 100 per cent honest I'm asking for your opinion.

"I don't know how many times I've used a telephone during the last few years for strictly local calls. It isn't often, but I can only make an estimate and then send the amount in to the company—would you say?

"However, if that has been cheating, then I've been doing it all my life unconsciously and I'm afraid it would be an impossibility to square myself since I've used somebody's telephone occasionally for the past 30 years or more.

"Please tell me what you think I should do about it, for I must get this thing straightened out . . ."

MR. DICKINSON ANSWERED

"In reply to your letter of March 19, we wish to say that our company serves more than 20,000 customers, and it is reasonable to believe that there are at least 1,000 persons residing within our exchange areas that are constantly taking advantage of their neighbor's telephone service, without thought of compensation to the telephone company to cover the additional costs involved. As a matter of fact, there are many so-called "moochers," or non-subscribers, who deliberately demand more and better telephone service than our regular subscribers, and there is no doubt that many times our regular subscribers are inconvenienced by granting the use of their service to others.

"Telephone service is furnished to a subscriber with the understanding that his monthly rental pays the exchange service for his family or household only, and he does not have the right to sublet his service to others. However, it is an unwritten rule that the telephone company is always ready to aid and assist non-subscribers in cases of emergency.

"Your letter confessing a life-long misdemeanor has fanned the spark of hope of a moral betterment among our many telephone service borrowers. We, therefore, feel justified in absolving yourself and husband of any claims that might be applicable for telephone service rendered, and we further suggest that you continue the practice of using your brother-in-law's telephone for essential calls, providing he is agreeable, until such a time as we are able to obtain enough telephone instruments to fill the many orders that we now have on hand. We will, however, call on you at some future date with the hope of obtaining your permission to install a telephone in your own home. The ever present telephone instrument is an emblem of security, available for use at all times, and the cost per month is so little."

MRS. CROSS REPLIED

"I've intended to write and thank you for your kind answer to that letter for I surely appreciated the attitude you took and I want you to know that we plan on having a telephone installed when they become more plentiful again.

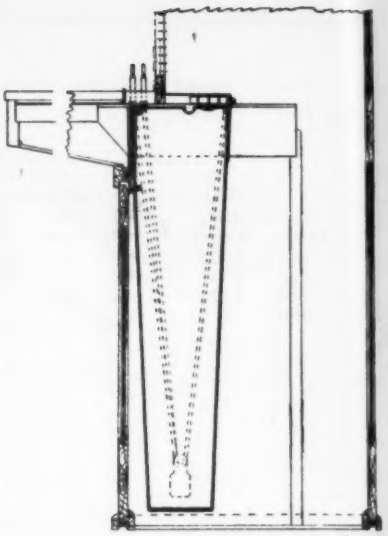
"We really do not have very much use for one right now, as my husband works at Kalamazoo, but someday he hopes to be able to quit the mill job and do plain carpenter work nearby and then a telephone would mean quite a bit to him in getting jobs.

". . . Anyway I was in earnest about wanting to make my wrongs right as nearly as was possible and was expecting to have to pay on the installment plan.

"Thanking you again."

SWITCHBOARD DUST-TRAP

By F. E. BABBITT



SWITCHBOARD POSITION SHOWING INSTALLATION OF DUST TRAP

ANALYSIS of switchboard trouble statistics indicate that the major portion of troubles could have been prevented had it been possible to protect the equipment from dust and other foreign matter that enters the interior of the switchboard through the apertures of the cord-seats. This accumulation of dust, unless trapped upon entry into the cord-well, requires a constant, thorough, periodic cleaning to remove it from the switchboard apparatus.

In addition, the repeated cleaning necessary introduces another particular trouble hazard. Because of the restricted space where such cleaning must be done, the possibility of troubles being caused by the movement of wiring forms and the jarring of equipment is great and trouble records indicate many troubles from this source.

Trouble Control

In order to keep switchboard troubles to a minimum and to reduce troubles caused by dust, a canvas switchboard cord dust-trap has been devised to trap all dirt and dust that enters the switchboard. The dust-traps are furnished complete with fasteners ready for installation. They are easily installed in the cord-well, convenient of access, exceedingly efficient in dust control, practically maintenance-free, and do not interfere with the normal operation or maintenance of the switchboard equipment.

The most desirable of the many features of the dust-trap is the complete control of all foreign matter that enters the switchboard through the plug-shelf, including the cotton particles that wear from the outer fibers of the cords. The dust-trap can be cleaned with a vacuum cleaner and standard hose attachment without removing it from the cord-well. However, if desired, the dust-trap can be easily removed and replaced when switchboard changes or alterations are underway.

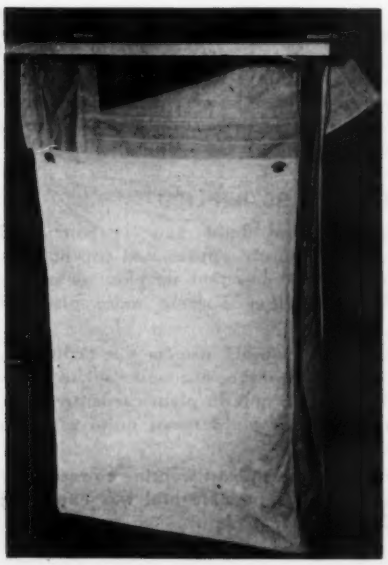
Incidental Benefits

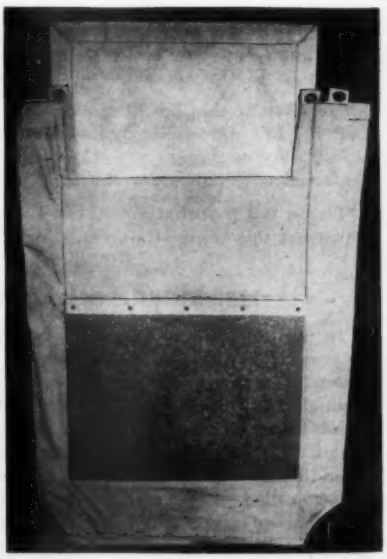
While the primary objective of the trap is the control of foreign matter after entering the switchboard, it also serves to reduce the number of cord and switchboard troubles from other causes. To emphasize one advantage in this regard, attention is directed to the fact that existing cord bumper boards can be eliminated completely. These boards were designed to prevent the cord weights from striking the wiring and equipment. However, experience has shown that occasionally the weights would hurdle the bumper boards and cause trouble.

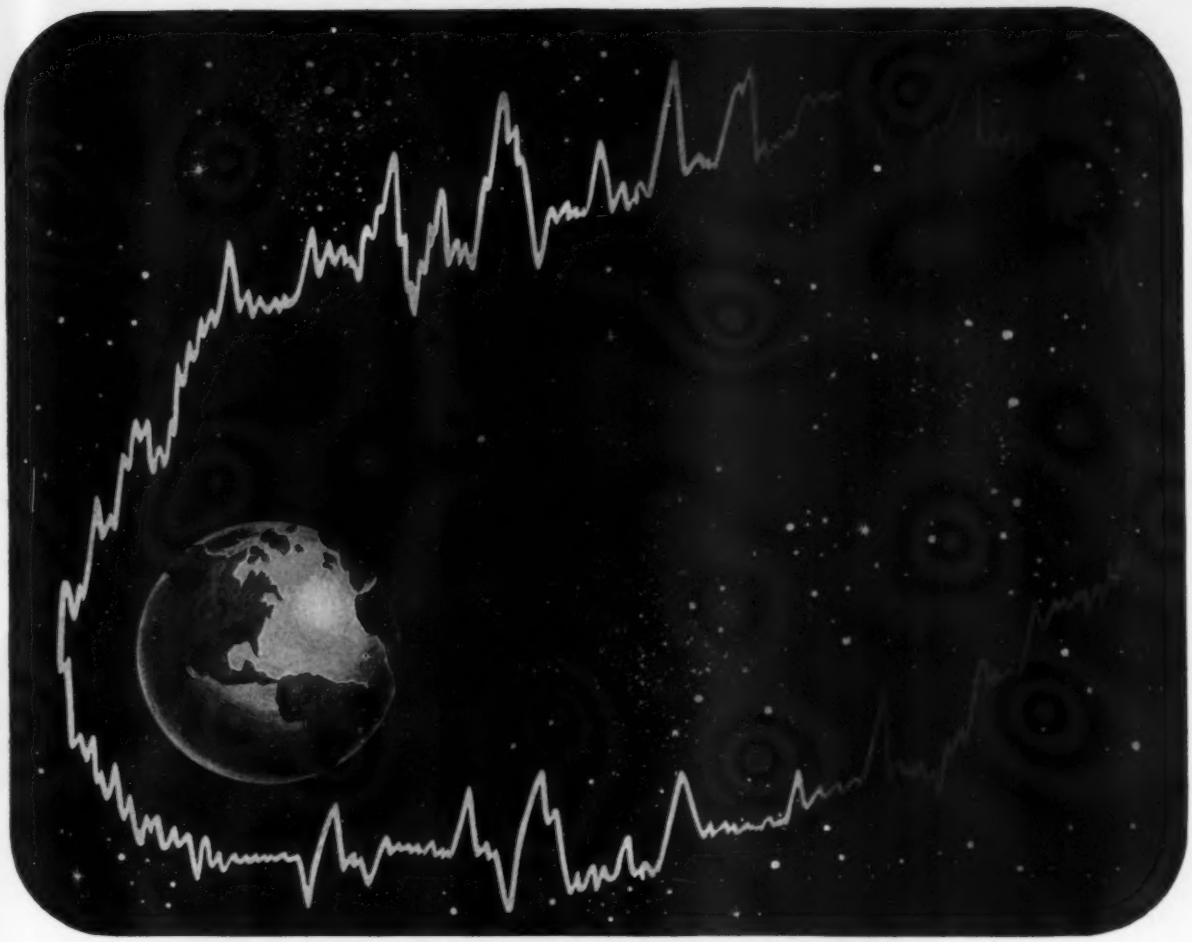
With the dust-traps installed bumper boards are not required since the dust-

(Please turn to page 40)

LEFT PHOTO: View looking from the front of the switchboard showing method of fastening into position. CENTER PHOTO: View showing convenient flap cover partly opened, giving quick and easy access to all cords and their terminal connecting lugs. RIGHT PHOTO: Receptacle turned inside out to better show a tempered, waterproof, hardboard bumper, that is suspended from a flexible canvas hinge which is sewed to the back of the dust trap. This board acts as a guide for the cord weights and prevents wearing out of material.







11 YEARS AGO THIS MONTH

THE HUMAN VOICE MADE ITS FIRST NON-STOP JOURNEY AROUND THE WORLD

On April 25, 1935, "long distance" was stretched to its full length. For on that date the first 'round-the-world telephone conversation took place . . . and another communications victory was won over time and space.

Yet, when measured by distance alone, this great achievement is far surpassed by the countless miles traveled by the human voice every second of the day in normal local service. And whether the distance is but a few blocks or thousands of miles the calls go through . . . promptly, clearly, without confusion . . . in keeping with the telephone tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, forty years before the first transworld conversation, Exides have been proving themselves worthy of that trust.

Exide
TELEPHONE
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

MANUFACTURERS OF TELEPHON

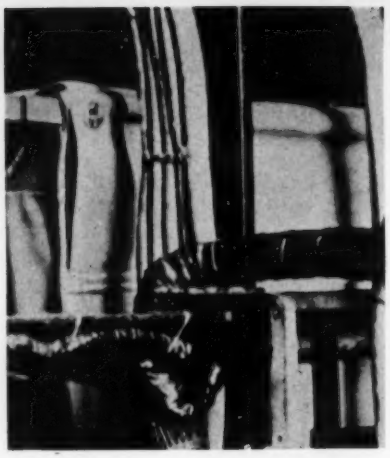
Spring CONSTRUCTION TIME—
TIME TO CALL LEICH . . . .
Telephone men know from experience that good equipment pays dividends. "Any old" pliers or just "some" wire won't do.
That's why Leich gets the call. Here at Leich are the finest in supplies and construction materials for every spring construction need. Every item is job-proved, every one made of the best available materials to the high standards set by the independent industry.
Here also, telephone men buy with complete confidence because they have learned that the Leich guarantee gives them full protection. Yes sir, it's spring, and it's time to get the plant in tip-top shape. May we help you.
Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois
SLYN-
LEIN
MILLERS FALLS
KESTER
RELIABLE
EVEREADY
AMERICAN BEAUTY
Amertel
TELEPHONE AND TELEGRAPH WIRE
AMERICAN STEEL & WIRE COMPANY
CHURCHILL
NE TOO GOOD—
RGESS
LENZ
BARTLETT
W. N. MATTHEWS
SEYMOUR SMITH
UNIQUE
GREENLEE
NNICOT
LEACH
OSHKOSH
TCHBOARDS AND RELATED APPARATUS SINCE 1907

trap prevents cord weights from striking wiring forms and equipment. It also has the effect of a sound-muffler and reduces the noise which is created by the normal operation of the cords and weights and results in a much lower level of noise in the operating room. It gives the interior of the switchboard a neater appearance and reduces the time of cleaning. In all instances where the dust-traps are in service, a 75 per cent saving in costs of cleaning has been possible.

Efficiency Record

The first dust-traps, which are still in service, were originally installed in a telephone exchange switchboard in 1937. They show practically no signs of wear after their nine years of continuous service. The performance record for these dust-traps was under constant and close observation for several years to ascertain their efficiency. To insure the recording of accurate results under trial, the switchboard was divided into two parts, one of which was equipped with dust-traps, and a sealed partition was provided to isolate it from the positions not equipped with traps.

The results of this trial, conducted under average operating conditions, proved conclusively that the traps met every claim expressed for them. After this exhaustive test period it was decided to equip all of the switchboard positions in the area with the dust-traps and a substantial saving of cleaner's time with a reduction of trouble was obtained. The study was continued from 1939, after all positions were equipped, for a period of three years and again the results indicated the efficiency and worth of the traps. Approximately 3,000 dust-traps have been installed to date.



Dust trap installed and in service. Although the equipment obstructs a clear view, it shows how the flap cover fits over the top of the cord shelf, protecting connecting terminal lugs.

Construction

The drawings and photographs illustrate the construction details of the dust-trap and the method of installation. The body material used is army duck and is held in place with standard grommets and turn buttons. They can be manufactured to fit any switchboard and are of great benefit when used in PBX boards where the cleaning is completed without the close supervision possible at central office installations.

Manufacture of the dust-traps was seriously curtailed during the war for lack of essential materials which were reserved for the armed forces. However, the materials are again available and manufacture of dust-traps is now under way with normal production expected in the near future. No special tools are required and any local maintenance force can make the installation.

Operators Hear "Number, Please?"

There's a long line in the building that houses the Long Lines Department of the American Telephone & Telegraph Co. in New York City each Thursday, but it isn't the long line which connects New York with London, Paris or Moscow. It's made up of the "hello girls" themselves as they flock into the auditorium to hear someone else say, "Number, please?"

February 21 was the third anniversary of the Victory Sing of the long lines department employes. What started as a war relaxation and morale boosting measure has developed into productions to rival those of Broadway.

The building at 32 Avenue of the Americas houses the long distance, radio network, teletype and numerous other branches of the company and is, officials say, the largest communication center in the world. With some 8,800 persons working in the building, there was plenty of room for ideas on recreation and there was no wrong connection when employes hit on the idea of a Victory Sing.

One Thursday a month a department will take over the stage, putting on a half-hour show at 11:30 a. m. Because of the size of the would-be audience, the show is repeated at 12:30 and 1:30 p. m. On other Thursdays employes take part in an old-fashioned sing with members of the audience coming up to do numbers while others leave whenever they have to go back to work.

About 2,000 persons watch the shows and more than 500 have taken part since the "sing" started. The employes get together, make a lot of the costumes, paint scenery and plan the whole thing.

The shows vary in theme, depending on which department is doing them. Sometimes there are fashion shows, full musicals or separate vaudeville acts, from ballet to barber-shop quartets.

"The kids are always scared but they are good sports," said Irene Culhane, chairman of the sing. "The singing males may blush a little when the audience squeals and yells 'Frankie'; everyone overlooks any amateurishness because it's all part of the fun and the laughs. The Victory Sing is sort of a personal phenomenon. It came about spontaneously and officials of the company had nothing to do with it. Only once did an official hand come into the picture. That was when we heaped vegetables on the stage and let the men go to work creating hats for the girls to model. The winning artist was the assistant treasurer, who fashioned a delectable model out of cabbage leaves and carrots."

IMPORTANT
PRICE ANNOUNCEMENT!

As a result of the widespread and progressive increases in the costs of all labor and material entering into our products, we have found it necessary to place in effect a general increase in prices.

A complete new schedule of prices becomes effective April 24, 1946. All shipments made on and after that date, except on contracts for main exchange installations, will be invoiced at prices prevailing at the time of shipment, and all prices will be subject to change without notice.

The necessity for this action has been dictated by causes beyond our control, and we have taken such action only after the most careful consideration.

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus . . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions

AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, U. S. A.

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Their Equent

STROWR A

Today, as perhaps never before, the smal gn of proving its value. Operating men are expa Strow present urgencies by merely "jacking in" new on exis greater growth is required, new shelves and being matter how extensive the expansion may be, the quipm ordinarily not disturbed.

This Strowger flexibility has always been important nomy has prevented the wasteful replacement of useful equ ely b sign caused it to be "outgrown". Today, with the una shorta ment, this Strowger flexibility is priceless.

Mark "Strowger Automatic" on your specifications and e tural tion (and profit) that comes with a "bigger and better" d the to serve your territory adequately at all times.

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Makers of Telephone, Signaling and Communication Apparatus . . . Electrical Engineers, Desi sultants

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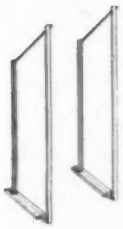
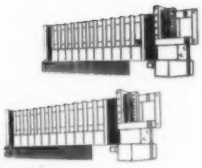
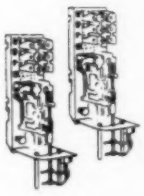


STANDARD FRAMES are rigid, welded-and-bolted steel structures of standardized design, upon which the switches and shelves are easily mounted.



STANDARD SHELVES provide mounting facilities and switch jacks, with all wiring completed to a terminal block at the end of each shelf.



STANDARD SWITCHES each comprise a complete switch mechanism with associated relays—wired, and with wiring terminated on a "jack" on the base.

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Chica A.
CORO N

THE PLANT MAN'S NOTE BOOK

BY
RAY BLAIN
TECHNICAL
EDITOR

A MAN WHO travels extensively informs us that it is becoming increasingly difficult to find pay-station telephones in the average small city and town. It further is stated that when pay-stations are located, they usually are busy and that comparatively large hotels have only two or three booths in the lobby.

All this causes us to wonder if perhaps many Independent companies have not neglected this type of business. Certainly, pay-stations prove a good investment in practically all exchanges.

* * *

According to *Life* magazine, Mary Roberts Rinehart has conquered the telephone menace which drives so many writers crazy by an arrangement whereby her calls are taken during the day by her sons' publishing firm, Rinehart & Co. This firm has a direct line to her home and relays only urgent messages immediately. Other calls are reported to Mrs. Rinehart at the end of the day.

* * *

Telephone parts, such as induction coils and condensers, which can be plugged into the set or connected by a screwdriver are certainly an improvement over the soldered connection method. When a troubleman replaces a telephone part on the job and a connection must be soldered, this work is usually slighted due to inadequate soldering facilities. A defective soldered joint means trouble later and another service complaint.

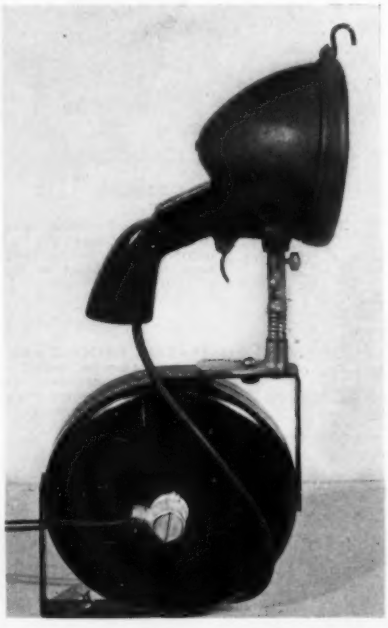
Another advantage of these new, easily replaced parts is that they make testing easy, for a coil or a condenser can be replaced on suspicion.

* * *

We hear frequent mention these days concerning new uses for voice recording, the latest of which is a large auction room where both the auctioneer and the clerk have microphones so that bids can be verified and recorded to avoid misunderstanding later. Truly, verification of the spoken word serves many useful purposes.

* * *

The trouble light shown in the accompanying photograph should fill a definite need in the telephone industry. The ordinary flashlight generally does not provide sufficient light for telephone trouble shooting. The portable light shown may be equipped with a



15, 21 or a 32 candle power, 6-8 volt bulb. Either dry cells or the trouble car's storage battery can be used for power. The pistol grip and trigger switch provide convenient control. A wide spread or narrow beam light may be provided, as required.

* * *

An old friend of the writer, W. J. Robinson, recently retired after 46 years of service with the Southwestern Bell, gives us some humorous thoughts on the old days in the telephone game. Then, it took a crew of seven or eight men an entire day to install a single telephone. Now one man installs a telephone completely in 90 minutes.

This improvement has undoubtedly been made possible due to better equipment and methods being adopted. Also, the installer of today is better trained than back in the old days.

* * *

We note that some of the Bell companies have adopted the practice of sending calendars each year to all farmers living near their cable routes. These calendars, in addition to being attractive and useful, also contain instructions to call a certain number COLLECT when digging operations are noted near the cable route.

* * *

During the war there was a definite increase in the use of adhesives to replace both welding and riveting. It is believed that this trend will increase and that eventually house wire will be attached to walls by the use of adhesives rather than tacks. The adhesive should hold satisfactorily and will not mar the woodwork. There has already been considerable development work completed on a rubber wire mold which is attached to floors by the use of adhesives.

* * *

Someone has said, "I believe in getting into hot water. It keeps you clean."

* * *

Recently, we overheard a telephone manager voice the fear that telephone recording would reduce toll revenue. We doubted this but as it is an interesting subject, we decided to investigate it from various angles.

The available information indicates that a telephone voice recorder does reduce definitely the length of the average toll call. This is accomplished by eliminating the need for repetition in connection with the transmission of involved information such as numerals and other complicated details.

If the conversation is clear and distinct, the user is assured that the recorder has made an accurate record

which can be repeated as many times as are necessary on the playback until it is clearly understood. This reduction in waste time will increase the efficiency of telephone toll service and result in subscribers originating a greater number of calls.

Also, when recorders are used, a permanent record will be available for future reference and in many cases a toll call will be made to conduct business which is now handled by letter mail. Toll circuits and other equipment will operate at a higher level of efficiency and the cost per call to the telephone company will be considerably reduced. There will also be fewer service complaints and a reduced number of requests from subscribers for cost adjustment due to inferior service. This should improve the public relations of any telephone company.

PLANT MAN'S QUIZ

(Q) Please advise whether carrier frequency telephone circuits are subjected to the same interference from parallel power lines as is experienced on physical telephone circuits.

(A) Carrier systems are less susceptive to power circuit induction than the average physical circuit. Carrier systems generally make use of frequencies from 5,000 to 30,000 cycles which is well above all important harmonics of a power system.

Other features of carrier system lines also contribute to this improvement. The wires are spaced eight inches apart on the crossarms and phantoms are not used. Point transpositions are used which permit a change of wire position on a single crossarm. This type of transposition and the close spacing of the line wires makes even the voice frequency channels less susceptible to power interference than is encountered with the conventional type of toll line construction.

* * *

(Q) We have a job which will require that a long run of cable be cleated to the walls of a brick and stone building. Will you advise what type of anchor should be used to hold the cable clamps in place?

(A) Various types of masonry anchors are available, any of which, if of the size to fit the cable clamps used, will prove satisfactory. The drive type anchor which is expanded by driving a nail in the center saves considerable labor on a job of the type you mention.

* * *

(Q) We experience considerable difficulty in removing the wedge from the sleeve of a drop wire clamp after it has been in service for a long length of time. Can you indicate how this task can be accomplished?

(A) In our experience, the best method is to use a pair of diagonal cutting pliers. Place the blade against the end of the sleeves and grip the wedge. Then pry toward the wedge. This should loosen the wedge and remove it a small fraction of an inch from the sleeve. Repeat the operation until the wedge is free.

* * *

(Q) We experience considerable difficulty in hanging our platform and working on cable suspended by the spinner method. Can you give us any advice on this subject?

(A) This should not prove difficult providing proper equipment is used. The accompanying photograph indicates a platform suspended on spun cable with a slack puller used to provide necessary slack in the cable.

(Q) We have a need for some means of marking the height of poles which are set in the line. What method would you suggest?

(A) We would suggest dating nails with suitable numerals to indicate the pole height. These nails can be obtained from your telephone supply house.

* * *

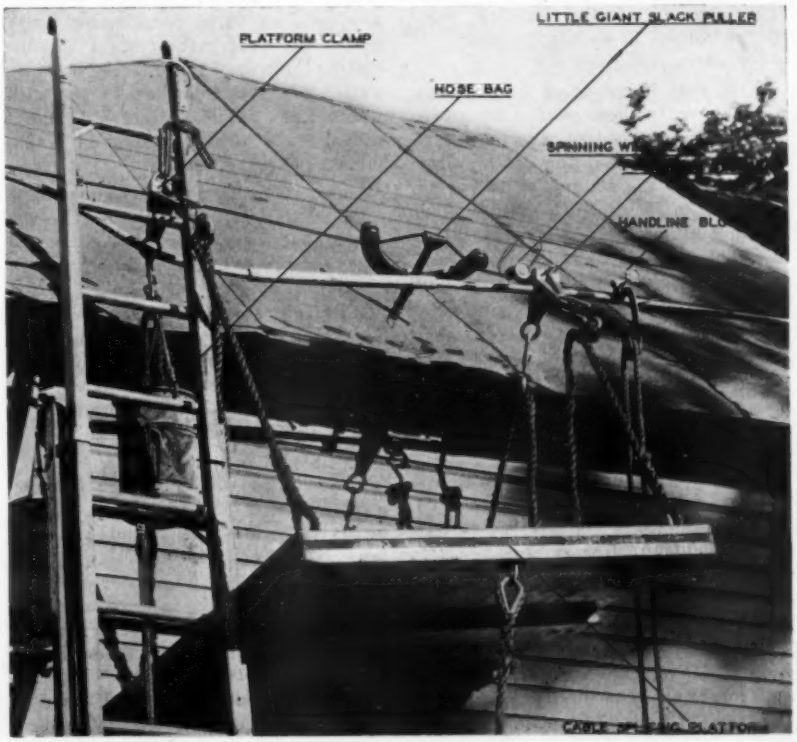
(Q) We experience difficulty in the removal of the outer braid on parallel drop wire without injuring the insulation of the conductors. Can you advise us whether there is a special knife which can be used for this purpose?

(A) We would not suggest the use of a knife of any type for this purpose. A braid stripper which consists of a circular blade mounted in an aluminum casting will prove more satisfactory and will not injure the insulation. This tool can be procured from your telephone supply house.

* * *

(Q) How often should a telephone type storage battery be recharged if standing idle to insure its maintenance in a first-class condition?

(A) Storage batteries do lose capacity while standing idle and it is generally considered desirable to give them a freshening charge about each 60 days. The rate of discharge of storage batteries while standing idle is negligible at low temperatures, but increases rapidly with increase in temperature.



IN THE NATION'S CAPITAL

BY
FRANCIS X. WELCH
WASHINGTON
EDITOR

Mr. Welch corrects previous statements concerning the CPA restriction on building construction. . . . USITA giving consideration to effect that adoption of radio to supplement telephone service will have on 2(b)(2) exemption section of Communications Act.

CORRECTION is in order concerning an item appearing in this department several weeks ago. It had to do with the Civilian Production Administration (CPA) restriction on unnecessary building construction estimated to cost over $15,000. Your correspondent inaccurately stated, on the basis of some erroneous advance information, that the cost of labor was not included in determining whether a proposed building unit came within the $15,000 exemption. He also stated that the cost of plumbing, heating, and all forms of furnishings other than the "bare bones" of the building were likely dropped in estimating such cost —for exemption purposes.

Well, that is wrong on both counts. And this writer begs pardon for an inconvenience to readers who may have taken action based on such slips. (Judging by the letters, wires, phone calls, etc., a lot of folks must be just sitting on the rail waiting for Welch to fumble. It's all right folks—no complaint. Go right ahead—it's all part of the subscription price.)

Fact is that the cost of *both* labor and so-called "incidental" construction cost (plumbing, heating, "built in" furnishings such as counters, cupboards and other items affixed firmly to the realty) *are included* in estimating the total cost of a proposed building for purposes of determining whether it's exempt from CPA approval or not. If they all add up to more than $15,000, you have to get an okay from CPA.

The general purpose of this CPA restriction was to encourage and promote the building of housing units by preventing the diversion of scarce labor and material items into non-housing construction work. Although primarily aimed at less essential construction, such as theaters and recreational facilities generally, the order nevertheless applies to all types of commercial buildings, including those proposed to be constructed by public utilities to house plant facilities, commercial offices, etc.

Cost estimates—for purposes of coming under the $15,000 ceiling exemption—do not, however, include cost of specialized facilities, such as switchboards, switching gear, transformers, and utility plant items generally, which might be housed within such proposed new building units. Some question has arisen, however, with respect to estimating the cost of much larger building units. The question has to do with whether the applications, for CPA approval, have to be processed in Washington, or in the field.

Instructions have already gone out to some 60 CPA offices in the field to the effect that *where the total estimated cost of a proposed utility building is in excess of $1,000,000, the application must be processed in Washington, D. C.* This means, of course, that applications for the approval of buildings costing lesser amounts can be processed by the field offices without the necessity of clearing with headquarters in Washington.

Utility men wanted to know, right away, whether the cost of *specialized utility plant facilities*, including installations, must be included in this $1,000,000 classification. The answer seems to be "yes." CPA policy is to require that the total cost of the project (not just the building) including all new facilities installed—whether plant equipment or otherwise—is to be counted in determining whether the $1,000,000 ceiling applies. Some utility men feel, however, that since plant items such as switchboards and central office equipment generally, are not (by their very nature) competitive with ordinary construction materials and labor which might be devoted to the building of housing units, CPA ought to exclude them from consideration.

CPA may ultimately decide on such a course of action. But so far, it is the other way. A change could make quite a difference in processing utility applications which could more easily be handled through the field offices. Only very few proposed new telephone company buildings, during the current year, would amount to more than $1,000,000, if the cost of specialized plant equipment plus installation were excluded. But if these items must be included—and that is the effect of prevailing CPA interpretations—quite a few telephone company and other utility applications will have to go to Washington, before ground can be broken on new projects.

* * *

The United States Independent Telephone Association has been giving consideration recently to the interesting legal question as to whether the use of radio by a telephone company in supplementing wire service would operate to deprive it of its exemption as a "connecting carrier" under 2(b)(2) of the Communications Act. As a result of this exemption, most Independent telephone companies operate subject only to a very perfunctory form of FCC jurisdiction. The question arises whether the use of radio facilities by such companies would increase FCC jurisidiction.

USITA counsel, Norman S. Case, former member of the FCC and former governor of Rhode Island, has recently rendered a legal opinion, the effect of which was announced by the executive vice president of the USITA, Clyde S. Bailey, to association members. Mr. Bailey's announcement stated:

". . . The (Case) opinion is generally

to the effect that the exemption would not be lost, although it does suggest that some situations might develop which might possibly give rise to an attempt on the part of the FCC to claim jurisdiction.

"Upon this question a written legal opinion has also been furnished by the New York law firm of Winthrop, Stimson, Putnam & Roberts to the General Telephone Corp. This opinion is to the same general effect as the opinion given to us by our own counsel. Likewise, a written legal opinion has been furnished to the Gary Group of companies by its Washington counsel, the firm of Wheat, May, Shannon & St. Clair. The last mentioned opinion differs somewhat from the others and leans toward the view that the FCC might conceivably so interpret the statute that an Independent company would lose the benefit of the exemption, although stating that there is support for interpreting the statute in such a manner that the exemption would not be lost.

"These are days of intense centralization of power in Washington. The disposition of government agencies always is to expand their sphere of activity. The FCC is no exception to this rule. Our association counsel recognizes this and so do we. It could not be visualized when the Communications Act was enacted in 1934 that Independent companies might wish to employ radio to supplement their wire telephone service. How the commission will interpret our 2(b)(2) exemption in the light of such use is a question that only the event will tell. We naturally hope that the commission, when a practical case is before it, will interpret the statute as our counsel thinks it ought to interpret it. But it must be obvious to every Independent company that our counsel and our association are in no position whatever to guarantee that the commission will do so. It will, of course, be our purpose stoutly to argue that the commission is without jurisdiction."

Last week President Truman signed the so-called "anti-Petrillo" bill. It is the first substantial amendment to the Communications Act for a number of years. But it only affects the radio broadcasters—does nothing for the telephone companies or any other business.

This law puts a stop to certain practices indulged in by Petrillo and his union, which most people consider too high-handed to be tolerated. In that respect, it has a certain virtue. But in other ways the "anti-Petrillo" law provides a lesson in how *not* to legislate. Specifically, the Petrillo law provides penalties of up to a year's imprisonment and $1,000 fine for compelling or attempting to compel broadcasters to:

(1) Hire more employes than they want.
(2) Pay money for services not performed.
(3) Pay unions for the use of phonograph records.
(4) Pay again for broadcasting a transcription of a previous program.
(5) The same penalties could be invoked against persons interfering with broadcast of cultural or educational programs originating in foreign lands.

CORRECTION

An article on page 31 of the March 30 issue of TELEPHONY concerning the nomination of ROSEL H. HYDE to be a member of the Federal Communications Commission was erroneously entitled as the appointment of Mr. Hyde as general counsel of the FCC.

Mr. Hyde was nominated March 21 by President Truman to fill the vacancy on the FCC caused by the death of the late Commissioner William H. Wills.

Petrillo operates as a labor leader under a federal labor policy which places the labor unions in a privileged position—gives them certain privileges under the law which are denied to the rest of us. Petrillo is a single-minded man. Having seen long ago that the federal laws gave the unions special privileges, he set out to play those special privileges for all they were worth —and stay within the laws while doing so.

In playing the legal privileges for all they were worth, he merely did in his special field what everybody does under the laws which apply to them. Under the income tax law, for example, certain exemptions are allowed. Everyone qualifying for such exemptions takes them as a matter of course. Not to take advantage of legitimate income tax exemptions to which one is entitled would be to penalize oneself unnecessarily and for no good purpose. The practices indulged in by Petrillo were practices allowed under the federal laws applying to labor unions. Petrillo's offense has merely been that, being a perceptive person, he saw that they were allowable, while the rest of us didn't.

The public, beholding the consequences of Petrillo's adroit essays in law observance, was appalled. But did Congress go about correcting the labor policy which gave Petrillo such latitude for maneuver? It did not. Without bothering to correct basic defects in federal labor policy, it merely forbade, in the radio field, a few of Petrillo's specific applications of that policy.

Under federal labor policy, Petrillo still has plenty of room in which to exercise his fertile mind. Already, in anticipation of the passage of the "anti-Petrillo" law, he seems to have shifted his attention from radio to movies—a field not covered by the new "anti-Petrillo" law and a field that is ripe for Petrillo's special brand of legal aggression.

If Congress persists in its present method of trying to deal with Petrillo —that is, by running around after him closing doors that present federal labor policy gives him a perfect right to open—it has a long race ahead of it. Petrillo is fast on his feet, and Congress will never catch up with him this way.

A better way of dealing with a defective labor policy would be to seek to legislate for everybody—not just for or against Brother Petrillo and some of his more overbearing abuses of late union activity.

A controversy now raging in London over the future of the British Broadcasting Corp. affords convincing evidence that the British are by no means completely satisfied with the government-subsidized radio monopoly so often held up as a refreshing contrast to our own commercial system. So aroused has British public opinion become over the question, as the time for renewal of BBC's charter draws nearer, that the matter has been brought to the attention of a committee of cabinet ministers, who are exploring the entire subject.

One pioneer in British broadcasting reports that in discussions over the past six years he has found only a small minority of persons in favor of continuing the BBC on the present basis. About half of the people with whom he discussed the matter favored adopting the system used in Australia and Canada, where government and commercial broadcasting systems exist side by side. A public opinion poll earlier this year found that 43 per cent of Britons want both commercial and BBC programs. Fewer than five per cent of them, however, favor abolishing the BBC, and substituting a commercial system on the American model.

The present controversy stems from the Labor government's decision in January to double the radio license fee, payment of which is legally required of all owners of radio receiving sets. This had been about $2.00 a year, and now stands at $4.00. While this sum is modest enough, the British are apparently beginning to realize that there is no more deadening influence in any medium of public education and entertainment than control by the government. We in this country have endured a lot that is inferior in our radio fare, but we have at least been spared the final disaster of having the government decide what we shall hear.

The difference between us and the

British seems to be, as usual, one of temperament. They abhor a purely commercial sponsorship of radio, with its high-pressure advertising, and its indiscriminate mixture of tripe and occasionally offensive commercials with fine musical or educational programs. Instead, they seek some compromise between this extreme and the austere sterility of a supposedly autonomous authority that is actually a government monopoly. Americans are well aware of the mote in their own eye, but prefer to hope for the eradication of the abuses and excesses that now characterize our radio entertainment, rather than to tolerate transformation of the commercial system into one or more preserve for Washington bureaucrats. As the old lady said as she blissfully tuned in Frank Sinatra, "Everybody to his own taste."

* * *

The construction of a 300-foot microwave tower at "telecommunication" laboratories of the International Telephone & Telegraph Co. at Nutley, N. J., is under way. Though this point previously had a repeater station for microwave radio telephoning, the tower will mark a new step in what promises to be a vast exploitation of pulse time modulation and micro-ray beams. Some experts say it also marks a minor revolution in American communications systems.

In this movement away from pole-strung wires for both telephone and telegraph services, the underground "radio" coaxial cable system of the American Telephone & Telegraph Co., for transcontinental telephone communications, seems to be a considerable jump ahead. The "ends" of this copper sheathed, eight-tube conduit, working eastward from California and westward from mid-Texas, along a Los Angeles-New York arc that bends through the South, are expected to be joined in about a year.

Meanwhile, it is reported, the year is expected to bring completion of the radio-telegraph systems of Western Union, linking New York, Washington, and Pittsburgh, and Columbus, Cincinnati, Toledo, and Cleveland. And the automatic relay system at Atlanta is being expanded and adjusted to support installation in the South. This system requires repeater towers on hills or mountains, at varying intervals.

Both transmission methods are "bidding," as it were, for television association; and the microwave broadcasting service presents the possibility of combined, simultaneous use by FM radio programs, police networks, long distance telephone, and truck and train dispatching as well.

* * *

The communications industry is the gainer by a recent resignation in the State Department. Thomas D. Blake, assistant to the special assistant to the secretary of state in charge of press relations and, for a time, assistant press relations officer at the White House, resigned as of April 12. He will enter the employ of the International Telephone & Telegraph Corp. in its office in Washington, D. C.

Secretary Byrnes wrote to him that his experience in the White House, and in the State Department "should be of value" in his new undertaking.

Dean Acheson, under secretary of state, said that Mr. Blake had done "yeoman service" in the department.

* * *

New types of facsimile broadcasting equipment, developed during and since the war, were demonstrated to members of the Federal Communications Commission on April 16 by William G. H. Finch in the studios of his frequency-modulation radio station WGHF, at 10 East Fortieth Street, New York City.

Chief among the new instruments for transmission of printed matter, pictures, script and drawings was a facsimile set for home use, with which Mr. Finch will soon begin publication of a daily radio newspaper, *"Air Press."*

"Air Press" will be a four-column illustrated newspaper, containing four pages, each 8½ by 11 ins. The home machine can produce 46 square ins. or nearly 500 words a minute. Mr. Finch explained that the advantage of the set is that any person owning it can leave it on and have the latest news waiting for him whenever he wants it. He has already obtained United Press teletype service.

On Your Own Doorstep

There is more to fire prevention than reporting the gory details of death and destruction that result from carelessness and neglect. Fire prevention can only be brought about by the individuals responsible for fire hazards. So this brings the question of fire prevention right down to the home and place of business of every person.

A furnace, for instance, when properly installed, is provided with insulation to eliminate overheating inflammable surroundings. The same applies to the electric or gas water heater. Even the electric iron has safety devices, but individuals are responsible for their use. Electric wire is made as nearly fool-proof and fireproof as possible, but again the human element can render its safeguard valueless by carelessness or neglect. In building new homes and factory buildings, countless provisions are made for fire safety which counteract human carelessness to the greatest possible extent.

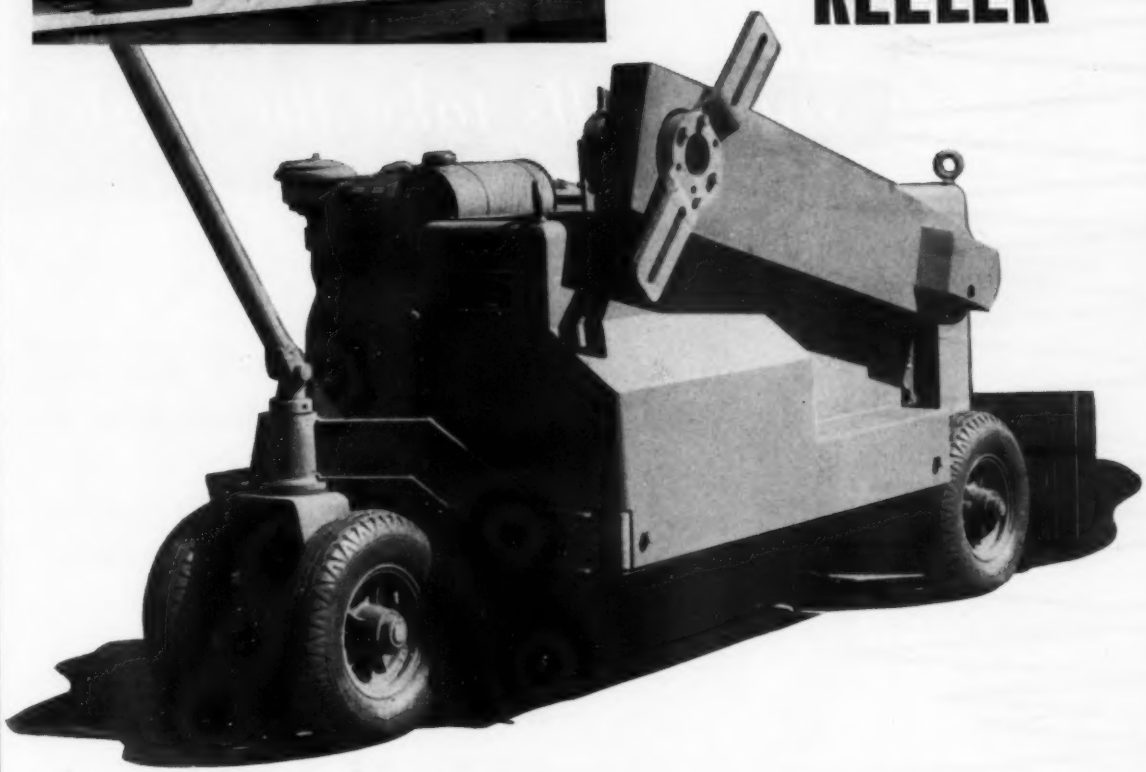
A guest in a hotel feels much safer sleeping in a room if he knows a sprinkler system is ready for instant use in the event of fire. Recently a large Chicago hotel had three fires within a week's time, any one of which could have taken lives if the hotel had failed in providing proper fire prevention measures beforehand. Every home and building cannot afford a sprinkler system, but the occupants of such places can refrain from using pennies or other metal objects in place of fuses. The occupants of such places can see that all wiring and heating systems have needed attention and they can clean up trash, dirty rags, paint cans, paint brushes, oil, etc., which are all potential fire hazards.

The same rule goes for fire prevention as for health—"An ounce of prevention is worth a pound of cure." And nobody but the individual whose life, property and health are at stake, can, in most cases, provide the "prevention" that will forestall calamity.—**Industrial News Review.**

» *The boss was deeply absorbed in a knotty problem when his secretary intruded. "Your little girl wants to kiss you over the telephone," she announced.*

Without looking up he waved the young woman away impatiently. "Take a message. I'll get it from you later."—**Orville E. Reed in *Coronet***

THE NEW JENSEN
POWER CABLE REELER



ELECTRIC OR *GASOLINE MOTOR POWERED

•

SKID MOUNTED OR MOBILE

****Equipped with Electric Starter***

Tested in actual operation under varying field conditions, the new Jensen Power Cable Reeler has been proved capable of efficiently, speedily, handling reels of all sizes, all types.

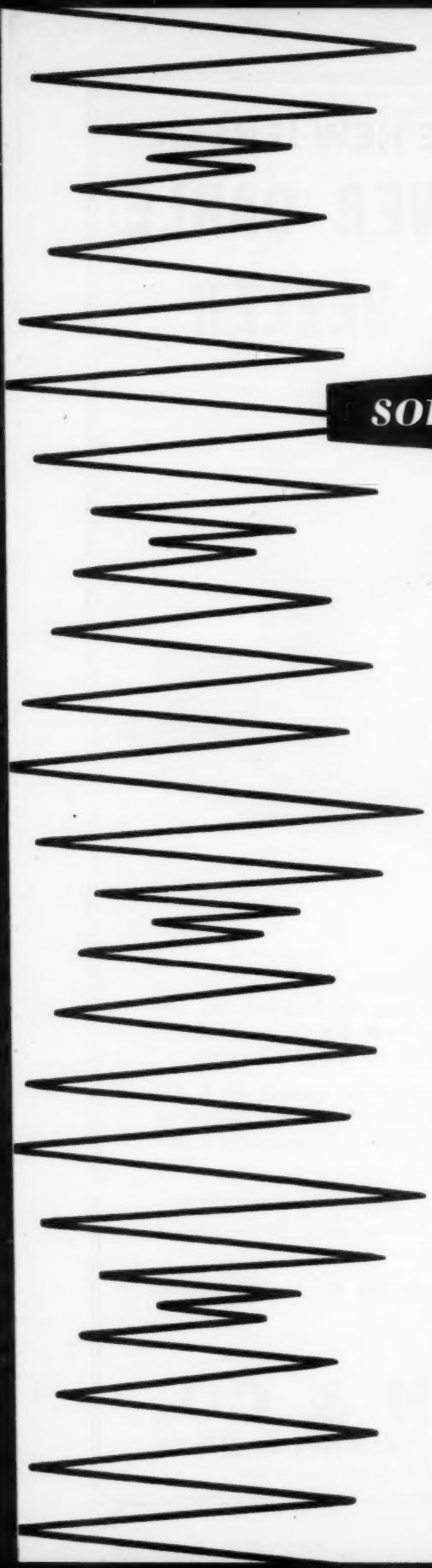
The Power Reeler has four positive controlled speeds—4, 8, 15, and 24 R.P.M. Remote foot control makes it ideally suited to one-man operation. It offers reeling speed plus highest cable protection.

Standard models—electric or gasoline, skid mounted or mobile—are now available . . . or the Jensen Power Cable Reeler can be tailor-made to meet your specified demands.

Your inquiry is invited—get complete details, at no obligation to you, by writing

HARRY M. JENSEN & CO.

5468 W. POTOMAC AVENUE **CHICAGO 51, ILLINOIS**



some calls take the high roa

Few people realize that radio, too, plays its part in the transmission of telephone messages. Yet this technique is one of the most striking examples of telephone research, development and progress.

Telephone advertising now tells the story. The advertisement on the opposite page appears in national magazines during March and April. It indicates the telephone industry's policy of using every means to give better service and more service to more people.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

Your Telephone uses wires and radio

Maybe you've thought of the Bell Telephone System as using only wires. It uses and pioneers in radio too.

Through radio voice-ways it reaches across the seas to the world's telephones. At home, radio waves carry your calls across water barriers.

Radio links provide mobile telephone service for vessels plying inland waters and for ships at sea. Before long, such a service will also be available for motor vehicles.

Work is moving right ahead on an experimental radio relay system to carry Long Distance calls and television programs between New York and Boston. A similar system is planned between the cities of Chicago and Milwaukee.

In every case the Bell System uses the kind of transmission, wire or radio, that gives best service at lowest cost.

BELL TELEPHONE SYSTEM

"Up in the Air" or "Down Under"

GENERAL CABLE

Quality Pays

● Whether your plans call for aerial or for underground installation, you can count on General Cable quality and workmanship to reduce repairs to a minimum. General Cable's wide line assures you of just the right cable for your specific need—a cable that is durable and practically trouble-free.

Backed by a half-century of experience, the finest of materials, and craftsmen working with the most modern machines, General Cable offers you the best in quality and service.

General Cable can be supplied for any aerial or underground requirement; so when you buy cable, be sure you get the protection of General Cable quality. Turn to your big Automatic Electric catalog for complete cable specifications and ordering information.

MANUFACTURED FOR
AUTOMATIC ELECTRIC COMPANY
By GENERAL CABLE COMPANY

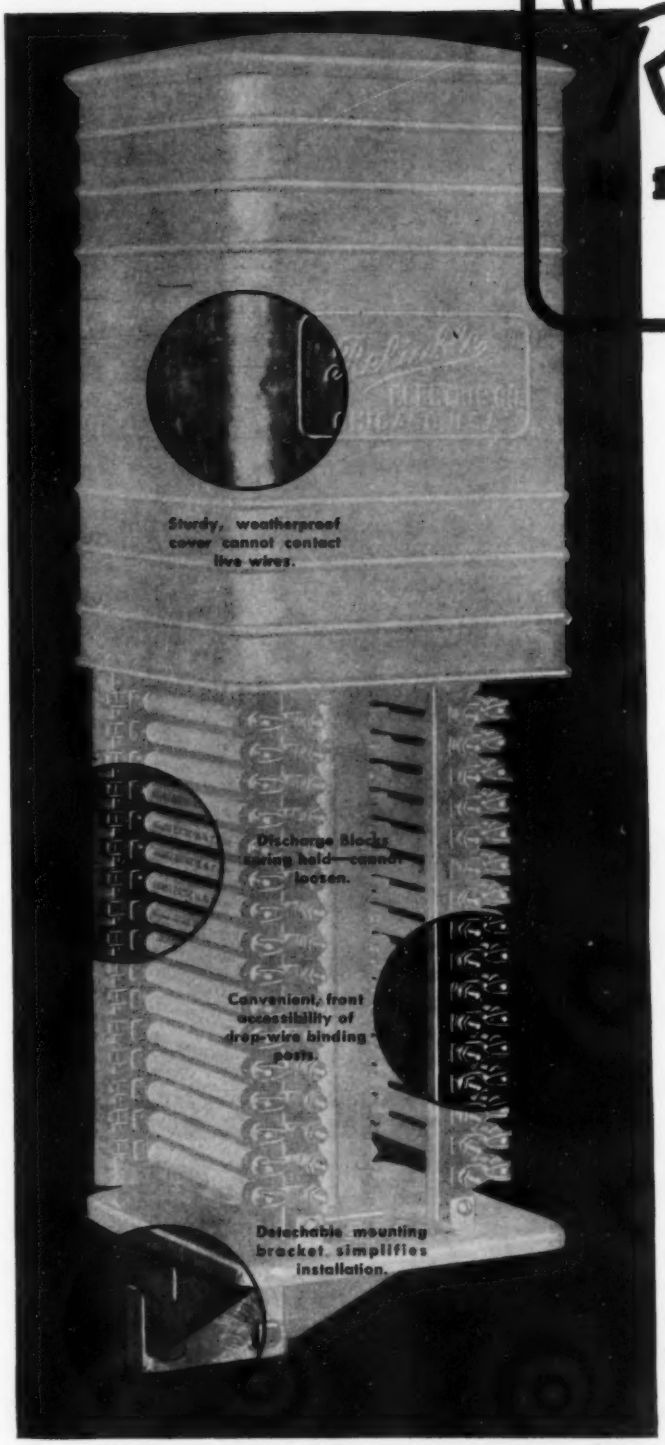
RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET • CHICAGO 7, ILLINOIS

"Reliable"

the word for it!


Sturdy, weatherproof cover cannot contact live wires.
Discharge Blocks spring hold—cannot loosen.
Convenient, front accessibility of drop-wire binding posts.
Detachable mounting bracket, simplifies installation.

A simple, conservative summary of Reliable B-Type Protector performance. This terminal is preferred for its simplicity—easy to install, easy to maintain, ruggedly constructed to outlive the cable. Proper materials and methods of manufacture, dictated by research and field experience, minimize corrosion, season cracking and other persistent evils. Reliable Self-cleaning Sawtooth Discharge Blocks are standard, dissipating static discharges without time lag or unnecessary grounding of the line. The "B" Terminals are available in 11, 16, or 26 pair capacity with type 27, 55 or 56 Reliable fuses. Code numbers are B-27, B-55, B-56.

Build for the future—specify "Reliable."

RELIABLE ELECTRIC COMPANY

3145 CARROLL AVENUE
CHICAGO 12, ILLINOIS

OVER 35 YEARS SERVICE TO THE TELEPHONE INDUSTRY

If you have served independent telephony for fifteen or more years, you are eligible for membership in the Independent Pioneer Telephone Association. This is an honorary association, composed entirely of veteran telephone men and women.

Your friends in this national group are other owners and employees of telephone companies, as well as manufacturers and suppliers of equipment. All of them are people who grew up with the independent telephone industry . . . who helped build it, who value their friendship and association with other telephone folks, and who have joined the Pioneers to continue these friendships and perpetuate the ideals they helped to establish.

This membership certificate is a thing to be proud of. It can't be bought; it must be earned. Those who are members display it proudly . . . they regard it as true recognition for their many years of faithful service to an industry where service is preeminent.

To become a Pioneer, write for your application blank, fill it out and mail to the Independent Pioneer Telephone Association, 632 Lemcke Building, Indianapolis 4, Indiana. The only charge is $2.00 per year, which covers all operating costs.

5 OR MORE YEARS OF SERVICE TO INDEPENDENT TELEPHONY QUALIFIES YOU FOR MEMBERSHIP

Write today for application blanks

THE INDEPENDENT PIONEER TELEPHONE ASSOCIATION
632 LEMCKE BUILDING • INDIANAPOLIS 4, INDIANA

This advertisement contributed by LEICH SALES CORPORATION

IOWA INDEPENDENTS

Hold 50th Annual Convention

By R. C. RENO

THE CURRENT desire of Independent telephone people to get together to discuss and find solutions to the many problems facing the industry in meeting the tremendous postwar demand for telephone service and to secure information about new developments and equipment designed to aid operating companies to render more and better service more economically was indicated at the 50th annual convention of the Iowa Independent Telephone Association, held April 11 and 12 in Des Moines.

While the actual registration at this year's meeting was not as great as in previous years when operators' conferences were held, more companies were represented, with a greater attendance of men than heretofore.

The program was designed to cover subjects of interest to all types of companies—large and small—and plenty of time was given for the operating people to visit with the manufacturers and suppliers to discuss and secure data on new equipment and tools. It was the first convention planned and directed by the association's new secretary, W. F. Miller, and he received the enthusiastic praise of the convention for the efficient manner in which he handled the meeting.

The following were re-elected directors of the association: C. A. Farrington, Centerville; W. H. Fowler, Pella; Lester D. Meyers, Woodbine; Don Mong, Newton; L. F. Morrison, Grinnell; Wilber Naylor, Kansas City, Kan.; J. P. Walters, Toledo. Other directors elected were E. G. Carlson, Creston; Earle D. Bellamy, Jr., Knoxville, and Torrell Ducket, La Mars, to fill vacancies created by the retirement of Geo. E. Atkinson, Creston; Earle D. Bellamy, Knoxville, and R. A. Phillips, Sioux Falls, S. D.

Other directors are Roy Brandel, Mt. Pleasant; T. J. Griffith, Fort Dodge; Clyde McFarlin, Montezuma; H. B. Melick, West Liberty, and C. C. Pearce, Riceville.

All officers were re-elected as follows: President, Mr. Fowler; first vice president, Mr. McFarlin; second vice president, Mr. Pearce, and secretary-treasurer, Mr. Miller.

The convention was opened with the showing of the motion picture, "Heritage of Victory," depicting the history and development of the telephone since 1876, through the courtesy of the Northwestern Bell Telephone Co.

Arthur Brayton, Des Moines convention bureau, gave the address of welcome and invited the association to return to Des Moines for its future conventions.

President Fowler, in his annual address, presented an inspirational message, in which he called for the cooperative efforts of all units of the telephone business in order to cement the industry into one strong working organization so as to be able to meet the public's demand for expanded and improved telephone service.

He emphasized that Independent companies — particularly the small companies — must begin immediately the rehabilitation of their plants in order to render the type of service which will satisfy the public—warning that if they do not make necessary plant improvements others may be asked to take over the responsibility of rendering telephone service in their communities.

Mr. Fowler also stressed the fact that the small companies, with insufficient revenues to operate their business on a sound basis and to improve their plants, must take immediate steps to secure adequate rates to produce sufficient income to cover the cost of providing good service and to earn a reasonable rate of return.

He urged all telephone companies to keep abreast of all new developments and equipment and to make plans to adopt as many as possible when they are put on the market.

Mr. Fowler paid tribute to the manufacturers and suppliers for their cooperation in keeping the industry supplied with materials despite wartime shortages. He also commended the trade papers for their efforts to keep the industry currently informed of the news and developments in the field.

Secretary Miller reported on the activities of the association and stated that there had been a gain in its membership during the past year.

In an inspiring address, entitled "Mental Reconversion," Tom Collins, Kansas City, Mo., nationally known

Officers and directors of the Iowa Independent Telephone Association. Seated (left to right): DON MONG, Newton; W. H. FOWLER, Pella; CLYDE McFARLIN, Montezuma; H. B. MELICK, West Liberty; J. P. WALTERS, Toledo; WILBER NAYLOR, Kansas City, Kan. Standing (left to right): ROY BRANDEL, Mt. Pleasant; L. F. MORRISON, Grinnell; W. F. MILLER, Des Moines; C. A. FARRINGTON, Centerville; E. G. CARLSON, Creston; LESTER D. MEYERS, Woodbine; TORRELL DUCKET, La Mars; T. J. GRIFFITH, Fort Dodge, and C. C. PEARCE, Riceville.

ACORN INSULATED WIRE

★ DROP WIRE ★ CABLE TERMINAL ★ BRIDLE ★ TREE
★ GROUND ★ SWITCHBOARD ★ INTERIOR ★ BURIED WIRE
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ACORN long life wire is a "must" in your maintenance and construction work.

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speaker, emphasized the need for reconversion of our processes of cooperating with one another. He stated that if new industrial developments and equipment were to be utilized in bringing about an improved living standard for this nation and the world, there must be the highest degree of cooperation between human beings in adopting and operating the scientific developments.

Verne E. Chaney, Chicago, vice president of the United States Independent Telephone Association, gave a detailed account of the activities of the USITA in connection with the problems confronting the industry from a national over-all standpoint.

Commenting upon the present government sponsored trend of permitting increased wages without allowing increases in the price level of commodities and services and the effect of such a trend upon the telephone business, Mr. Chaney stated:

"We have read that industrial wages could be further increased without an increase in the price level. . . . I don't see how we can constantly increase wages without sooner or later making increases in the cost of the commodity or service to the public.

"You are probably thinking, 'What does this have to do with the telephone industry and what effect does it have on us?'

"The Bell System has granted weekly wage increases during the last year to telephone operators in an amount that is as much or more than the Independents used to pay their operators in small exchanges. There is now talk of a pattern objective for telephone workers that is hitched to Bell wages. When we talk about telephone wages, we must divide the industry into two parts—the Bell and the Independent—because the effect of any schedule is different in degree and in terms of price levels.

"Let's take the Bell first. It is made up of companies operating principally in large cities having a large portion of the total telephones operated with dial equipment. It also operates the backbone of the toll system of the industry. It also has many small exchanges that render local exchange service through manually operated switchboards. When we think of the effect of wages paid telephone operators in the Bell System we must think principally of toll operators in the large centers and of local operators in the smaller exchanges.

"Consider a dial telephone exchange having 15,000 subscribers. In this case you would have about 30 toll operators if you owned the toll board. If you operated the local switchboard manually, you would add about 100 operators, making a total of 130 operators. Now, if you grant a $10 a week increase to each operator, see what happens to your net income as well as your telephone rate structure. In one case the operators' increase costs $300 a week and in the other the increased cost is $1,300 a week. On an annual basis it amounts to $15,600 as compared to $67,600.

NEBRASKA CONVENTION PHOTOS

Credit for a job "*well done*" should go to J. H. HARTLEY, Lincoln (Neb.) Telephone & Telegraph Co., whose untiring work and cooperation resulted in the many fine photographs which he took to illustrate TELEPHONY'S story of the recent Nebraska Telephone Association convention which appeared in the April 20 issue. Mr. Hartley is well known as a photographer of high standing in the field of amateur photography.

"Independents operate principally in the smaller communities of the nation on a manual basis and it is evident that an increase in wage levels is going to affect them to a greater degree than the Bell for the reason that a greater portion of the subscriber's dollar goes for labor.

"The average revenue per telephone in the Bell companies is about $82 as compared to about $46 for the Class A Independent companies and about $38 for Class B Independent companies. . . . It can be seen at a glance that it is going to be difficult to bring Independent wages up to Bell wage levels even though substantial increases are made in Independent rates."

Mr. Chaney also discussed the regulation of point-to-point and mobile radio-telephone service especially as to the effect it will have upon the Federal Communications Commission jurisdiction over Independent companies. He stated:

"In recent months there has been considerable interest expressed on the part of Independent telephone companies in establishing point-to-point and mobile radio service. In expressing this interest, numerous inquiries have been made as to whether or not the Independent company will lose its 2(b)2 exemption from FCC jurisdiction. It is certain that the FCC has jurisdiction over radio spectrum and will require that applications be made by anyone who desires to use such radio frequencies. There seems to be little doubt but what a company desiring to establish radio service between two points that are "interstate" in character will lose its 2(b)2 exemption. . . .

"Some Independent companies say they are interested in radio communications that are *intrastate* in character, but if they are going to lose their 2(b)2 exemption they say they cannot afford to become fully subject to FCC requirements. It would seem that any Independent company desiring to establish mobile radio or point-to-point radio service, which did not carry the service to a point interstate, should not lose its 2(b)2 exemption. . . .

"While the FCC has made no ruling on the matter of a company losing its 2(b)2 exemption in such cases, it is expected that this matter will require official recognition before Independent companies at large will undertake any expenditures for such developments or experiments. I think it is highly desirable that the Independents be given a "place in the sun" in these operations,

Iowa association director WILBER NAYLOR, Kansas City, Kan. (left), who took the photographs at the Iowa convention for TELEPHONY, takes time out to chat with LEO HALE, Corsing, Iowa.

otherwise any ruling by the FCC to the contrary will be tantamount to granting the Bell System a monopoly in rendering this class of service. I am reasonably sure the Bell System has no desire for such a monopoly and in several instances it has expressed its desire to give the Independents an opportunity to participate in mobile radio operations thereby preserving the Independent exchange area rights.

"There is also involved the matter

(Please turn to page 60)

A group of representatives of the Creston Mutual Telephone Co. gathered for this photograph before going into one of the sessions at the Iowa convention. (Left to Right): T. P. WELCH; W. H. BRADY; T. P. ROBERTS; G. E. ATKINSON; E. G. CARLSON, and F. C. SMITH.

DILLON BISECTOR

A QUALITY TOOL WITH A REAL PURPOSE

ACCURATELY LOCATES ANCHOR POSITION AND INDICATES AMOUNT OF PULL

EASY TO USE-RUGGED COMPACT-LIGHT WEIGHT

Photograph above shows Bisector in actual use. Spiked tip is driven lightly into pole to be guyed, and arms are aimed at poles to right and left. Operator adjusts peepsight barrel over center of each arm in turn until it is perfectly aligned with the right and left poles. Tailpiece then automatically indicates *correct* position for anchor. Anyone, without slightest experience, can obtain *perfect* results with the Dillon Bisector on the very first try.

$4.95 F.O.B. CHICAGO

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ELIMINATES GUESSWORK

The Dillon Bisector not only indicates correct anchor *position* but it *also* registers *pull* and *interior corner angle degrees!* By checking scale readings, (see photograph above), with the following table, operator obtains pull at a corner in *degrees* and load in *percentage* at a dead end. This information determines correct size of guy strand to use.

Pull Feet	*Interior Corner Angle Degrees*	*Resultant Force (Percent of Load at Dead End)*
10	168	20
20	157	40
30	145	60
40	133	80
50	120	100

A load on a corner pole at which there is a 20-foot pull, (157 Interior Corner Angle), is 40% of that at a dead end pole. At a corner at which the pull is 50 feet, the load on the pole equals that at a dead end, etc.

Makers of Dillon Dynamometers, Temperometers, and Testing Machines.

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as to whether the state regulatory body or the FCC would have jurisdiction over the rates, charges and rules governing such radio operations where the service is *intrastate* in character."

Of interest to the smaller Independent operating companies was the open forum on "Plant Matters" which closed the first day's session of the convention.

Those taking part as discussion leaders and their subjects were as follows: Frank Dixon, Knoxville—"Importance of Proper Plant Records"; William Humphrey, Newton — "Preventive Maintenance"; J. L. Holmes, Chariton — "Wire Transmission"; H. Filmore Melick, West Liberty—"Long Span Construction."

The second day's meeting opened with an address on "Present Labor Laws and Trends" by Harold Chenhall, Davenport, labor relations and personnel consultant. Mr. Chenhall, formerly representative of the federal Wage-Hour Division, presented a detailed and clear-cut explanation of the provisions of the Fair Labor Standards Act and directives and orders issued by the Wage-Hour administrator. He urged that all telephone companies secure copies of wage-hour rules in order to be certain that their policies are in accordance with the government regulations.

"Advertising" was the subject of an address of C. C. Pearce, Riceville, member of the USITA Advertising Committee. He urged that all companies plan and carry out a definite plan of advertising in their local newspapers in order to keep the public informed of problems confronting them and in order to secure new business and improve their public relations.

L. F. Roberts, Chicago, Chairman, USITA Advertising Committee, then told of the work of the national association's Advertising Committee in setting up the Telephone Advertising Institute which prepares all types of advertising material for the Independent industry at a very low cost. He reported that 890 Independent exchanges had subscribed to the institute and he asked all companies to investigate the institute's services with the view of becoming subscribers.

In this group photo taken at the Iowa convention are left to right: M. E. THOMPSON, Toledo; J. C. CROWLEY, secretary Minnesota Telephone Association; R. B. Miles, Kansas City, Mo., and Iowa Association Secretary W. F. MILLER.

Allan B. Kline, Des Moines, president of the Iowa Farm Bureau Federation and vice president of the National Farm Bureau Federation, spoke on the outlook for agriculture and gave an illuminating expose of the downward effect that rising farm labor and machinery costs are having upon the farmers' net income. He stated that as the welfare of business in cities, towns and villages depend to a great extent on the purchasing power of the farmer, that it was of general interest to the nation to see that the farm income was maintained at a high level.

Speaking of the current tight economic condition of today with its shortages of all commodities and food stuffs, Mr. Kline said that the greatest need today is an all-out production program so that the people can purchase the things they need with the money they have accumulated during the war years. As far as agriculture is concerned, Mr. Kline said the farmers' production could be easily increased by one-third.

In an interesting address, Walter Straley, Des Moines, executive assistant, Northwestern Bell Telephone Co., described the part the telephone industry played in perfecting radar equipment and technique during the war. He also discussed other wartime developments coming from telephone laboratories such as Spiral-4 and coaxial cable and the lip and throat microphones. He also told of the Bell company's current experiments with power line carrier and mobile radiotelephone service.

The last number on the program was an open forum on "Accounting Matters." Joe Long, Monroe, and K. E. Vine, Grinnell, led the discussions on two important accounting subjects—depreciation and the importance for telephone companies to keep proper plant accounts in maintaining records

The registration desk at the recent Iowa convention was capably handled by GERTRUDE JOHNSON, of the Des Moines Chamber of Commerce. Left, association director, ROY BRANDEL, Mt. Pleasant, and LAURA GOLDING, of the association's headquarters office.

to reflect their true investments in plant, which constitutes the major portion of the records upon which their rate base is developed.

In closing the convention, President Fowler stated that the officers and directors of the Iowa association asked and urged that all telephone companies in Iowa—whether members or nonmembers—call upon the association for assistance and guidance in solving any problem that may confront them.

Jailed for Stealing Pay Telephones

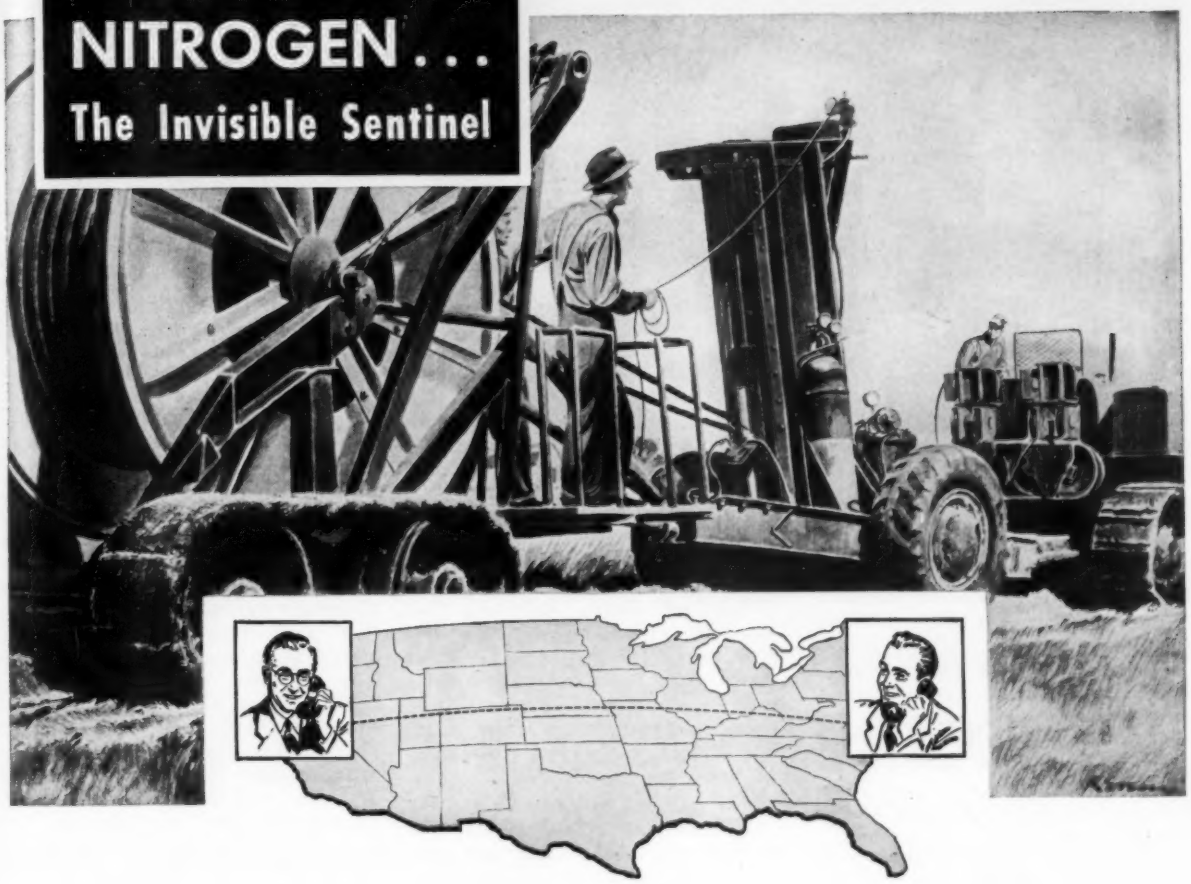
A soldier and a sailor were each sentenced to three months at hard labor recently by a magistrate in Vancouver, B. C., when what the prosecutor termed "an ambitious project" undertaken by the two went astray.

The servicemen were charged with attempted theft of two pay-telephones from Georgia Hotel in Vancouver on January 30, and a hotel employe testified the servicemen were seen hurrying from the hotel with two kitbags after a noise had been heard in the telephone booths.

The men put the bags in a parked taxi and then ran. They were later picked up by the navy shore patrol. Both men said they had been drinking. One said one of his kitbags had been stolen and he had sold the other.

»» *Hornero birds of Argentina and Uruguay occasionally disrupt telephone and telegraph communications by building nests of clay and straw on the crossarms of pole lines. The nests are baked hard by the sun, but when wet cause short circuits.*

NITROGEN . . .
The Invisible Sentinel



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Each day thousands of messages speed over the nation's telephone lines . . . from city to city . . . from coast to coast. In order to assure the clear uninterrupted reception of these messages, the telephone industry has adopted the use of dry nitrogen for protection of cables from moisture. This invisible, but highly effective agent . . . carried in the lines under pressure . . . stands guard against the entrance of moisture — even when an actual break in the cable occurs.

As an added benefit, the use of dry nitrogen makes it possible to compute the location of a break through comparative readings of station regulators. Thus, maintenance crews can move to the trouble-spot without delay.

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COURTS and COMMISSIONS

Three Minnesota Independents Sold

Sale of the following Minnesota Independents was authorized April 15 by the Minnesota Railroad & Warehouse Commission:

The Rothsay (Minn.) Telephone Co. to Omer L. Stowman; the Northome (Minn.) Telephone Co., sold by Elmer O. Lukkasson, Jr., to Charles H. and Lydia M. Trierweiler, and sale by Blind Lake Township of its telephone properties to the Pine River (Minn.) Rural Telephone Co.

In the sale of the first two properties, the commission stated no approval was thereby given to any increase or change of rates in the territories served. Upon transfer of the Blind Lake property, the Pine River exchange rural rates were to become effective there.

V V

Oklahoma Commission to Investigate Rates at Sasakwa

Following failure of the Sasakwa (Okla.) Telephone Co. to file its annual report, the Oklahoma Corporation Commission issued a journal entry instituting a rate investigation of the company on the commission's initiative.

Instead of citing the company to show cause why it failed to file the report, the commission, upon recommendation of B. Richardson, telephone engineer, filed the original proceeding. Evidence is to be presented on May 29, to determine whether any of the rates being charged by the company are out of line or whether its net earnings are excessive.

V V

Rate Increases Approved For Sharon, Okla.

Following a hearing, April 17, which had been continued from March 27, the Oklahoma Corporation Commission issued an oral order granting the application of the Sharon (Okla.) Telephone Co. for increased rates. (TELEPHONY, March 2, page 36.)

Authority was given to increase town residence rates from $1.25 to $1.50 per month and rural line service, where the company owns the line, from $1.00 to $1.25 per month. Where the subscriber owns the instrument the rate is to be reduced from $1.25 to $1.00 per month.

V V

Independent Seeks Return Of Territory Served by Bell

The Noble Hardy Telephone Co., Gene Autry, Okla., has applied to the Oklahoma Corporation Commission for return by the Southwestern Bell Telephone Co. of the part of its former territory north of Berwin (new name Gene Autry), which during the war, had been incorporated into an army camp.

At the request of the military department the Southwestern Bell was ordered to install a telephone system at the camp. Now that the camp is discontinued by the army the Noble Hardy Telephone Co., which still owns and operates the exchange in Gene Autry, now wishes to resume service to the area in the vicinity of the camp. The hearing is set for May 8.

V V

Association Offers Plan for Foreign Exchange Service

The desire to adopt a more uniform plan for telephone companies furnishing inter-company foreign exchange service was expressed both by the New York State Telephone Association and the New York (N.Y.) Telephone Co. at a hearing held April 1 before the New York Public Service Commission to discuss rules, regulations and practices of telephone companies in furnishing such service.

The term "inter-company foreign service" has been applied in cases where applicants located in the normal area of one exchange request service from an adjacent exchange of another company.

The association, which was represented by legal counsel, E. S. Wood of Johnstown, N. Y., offered the plan forwarded to the member companies on March 19 as a more definite and equitable means for handling requests for this special class of service.

As pointed out by Association President Fred S. Florance, the practice that has been followed up to the present time has not been generally satisfactory to either of the telephone companies involved, or to the applicants, and the association and the Independent telephone companies have recognized for sometime that a uniform plan should be adopted governing the furnishing of this service when it is warranted.

The basic principles of the plan provide: (1) Each of the companies involved would furnish and maintain the facilities within its own exchange; (2) the rates and regulations of the serving company would apply to that portion of the facilities within its exchange, and a new uniform schedule of rates and regulations would apply governing the facilities located in the normal exchange; (3) the normal company would handle all negotiations for service, would accept the application, bill and collect all charges; and (4) from the revenues collected the normal company would retain 50 cents per month per station for furnishing and maintaining the station equipment, inside wires and drop, 10 per cent of the telegrams, a percentage of toll messages and the mileage charges applicable within the normal exchange.

Representatives of the New York Telephone Co. testified that their company would be willing to adopt such a plan.

V V

Rural Residents Request Southwestern Bell Service

About 19 residents of a rural area near McCloud, Okla., spent several hours on April 17 telling the Oklahoma Corporation Commission why they wished to be attached to the territory of the Southwestern Bell Telephone Co. at Shawnee and receive telephone service from that company. (TELEPHONY, April 20, page 33.)

The Southwestern Bell has a territorial boundary line extending within

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SIMPLE — Just 3 operations to make a splice. (1) Strip wire ends. (2) Insert stripped ends in AMP Plasti-Grip Parallel Connectors. (3) Crimp once with AMP Tool — That's all there is to it. Ideal for limited space installation.

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1. Withstands 350° F. for 10 hours without physical damage or deterioration of insulating qualities.
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3. Does not support combustion when tested in accordance with ASTM D350-40T.
4. Insulating qualities unaffected by prolonged immersion in 10% salt solution.
5. Water absorption less than 1 ½ %.
6. Takes exact contour of crimp without distortion or cracking. Will not loosen or dry out.

POSITIVE — More efficient connection than solder. Maximum electrical and mechanical properties of AMP Plasti-Grip crimp assure permanent, trouble-free installations.

UNIFORM — Splices with the AMP Plasti-Grip Connectors are completely uniform in appearance. *You can't make a sloppy splice.* Visual inspection is adequate check.

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a few miles of the rural area but does not wish to extend its boundary farther west unless ordered to do so by the commission.

The McCloud Telephone Co., Charles Blakely, manager, has filed no boundary map defining its territory but has been serving part of the area west of the river. The company claims that it is now building two metallic lines into the farming community and will be able to give good service as soon as these are completed. The farming district seeking to be attached to the Southwestern Bell Telephone Co., exchange is about 20 miles from Shawnee.

Following an all-day hearing the commission took the case under advisement.

V V

OPA Ceilings Removed From Telephone Items

OPA price ceilings have been removed from telephone and telegraph items. The order specifically suspends price control from manufactured products, including a broad classification of telephone central office and other telephone equipment.

This is expected to mean an early pickup in the production rate of telephone manufacturers, who heretofore have been hampered in their efforts to catch up with the lag of unfilled orders.

V V

Union Telephone Co. Applies For Short Haul Toll Radio Link

Inauguration of experimental radio-telephone short haul toll service is being planned by the Union Telephone Co., Owosso, Mich., an operating company of the Telephone Bond & Share System, to supplement existing wire circuit facilities between that company's exchanges at Owosso and Mount Pleasant, which are some 70 miles apart.

Application for the necessary license was filed with the Federal Communications Commission on March 26, according to an announcement by B. C. Schweitzer, president and general manager of the Union company.

Three two-way talking circuits will be derived from the radio-telephone link through the use of carrier channel equipment broadly similar to that supplied for application to wire circuits. The two-way channels thus obtained will provide complete privacy of conversation. The carrier terminals, of Lenkurt Electric manufacture, will be furnished by Automatic Electric Co., Chicago, Ill.

The radio transmitters and receivers at Owosso and Mount Pleasant will operate in the 152-162 mc band. In addition to this equipment and the carrier terminals, there also will be a radio repeater station at Ithaca, approximately midway between the above two points.

The proposed radio-telephone toll link will initially provide for three types of service, namely, direct subscriber-to-operator service from the automatic exchange at Mount Pleasant to the manual exchange at Owosso, direct operator-to-subscriber service from Owosso to Mount Pleasant, and operator-to-operator service in either direction.

For the first-named type of service, the calling subscriber at Mount Pleasant will dial a code which will cause the seizure of an outgoing carrier channel to an operator's position at Owosso and place the radio transmitter on the air at the originating point. The operator at Owosso will acknowledge the call by "plugging in," and will thereby place the Owosso transmitter on the air and at the same time seize an outgoing carrier channel, thus completing the facilities for two-way conversation. The operator at Owosso will then prepare the toll ticket and proceed with the connection in the usual manner.

In the case of a call from Owosso to Mount Pleasant, the subscriber at Owosso will ask for "long distance" and give the necessary information to the operator who will, by "plugging in," seize an outgoing carrier channel and place her transmitter on the air. This operation at the same time will cause seizure of a link in the automatic exchange at Mount Pleasant, so that the operator may dial the called subscriber direct through the automatic switching equipment at the terminating point. Calls to Mount Pleasant from points beyond Owosso will be similarly handled.

In the operator-to-operator type of service employed in special cases, as for example where local help is desired for completion of calls, one operator will be able to call the other by merely plugging into the radio jack, which will place her radio transmitter on the air and light a lamp on the distant board. The distant operator will respond by plugging into her radio jack, thus placing her radio transmitter on the air. Ticketing information will then be passed by voice and the connection extended in the usual manner.

It will be noted that the operating methods to be used are substantially the same as for setting up connections over the existing wire circuits, except for the provision whereby the operator at Owosso may dial Mount Pleasant subscribers direct without requiring the services of an operator at the Mount Pleasant exchange. The dial impulses, converted to tones for transmission over the air, are received at the automatic office and reconverted to dial pulses for operating the automatic switches.

It may also be noted that the radio

COMING CONVENTIONS

Indiana Telephone Association, Severin Hotel, Indianapolis, May 1 and 2.

Illinois Telephone Association, Pere Marquette Hotel, Peoria, May 8 and 9.

Wisconsin Independent Telephone Association, Park Hotel, Madison, May 14, 15 and 16.

New York State Telephone Association, Hotel Onondaga, Syracuse, May 22 and 23.

Pennsylvania Independent Telephone Association, Hotel Roosevelt, Pittsburgh, June 6 and 7.

Washington Independent Telephone Association, Spokane Hotel, Spokane, June 14 and 15.

Oregon Independent Telephone Association, Multnomah Hotel, Portland, June 21 and 22.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 27 and 28.

Michigan Independent Telephone Association, Hotel Olds, Lansing, September 18 and 19.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 14, 15 and 16.

North Carolina Independent Telephone Association, Pine Needles Hotel, Southern Pines, November 11 and 12.

Alabama Independent Telephone Association, Jefferson-Davis Hotel, Montgomery, November 18 and 19.

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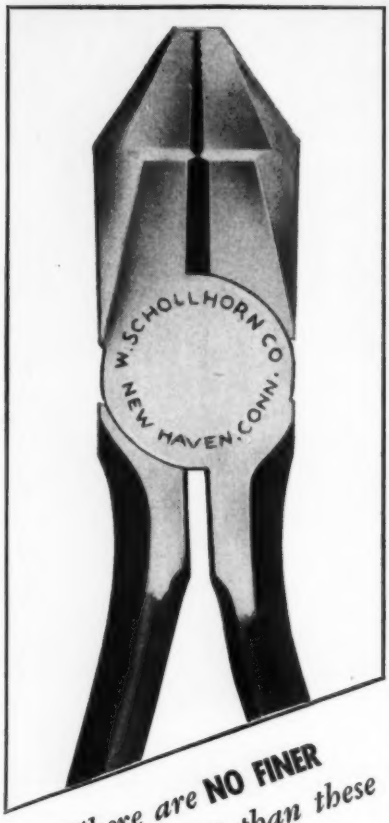

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transmitters will be controlled entirely by the circuits which interconnect them with the regular telephone facilities, and will be on the air only during the time that a call is in progress.

It is expected that experience with this project will reveal important data as to the grade of service and maintenance and operating costs for point-to-point radio as compared to wire circuits for short haul toll, and that such data will supply a valuable guide to the future use of radio links in other similar situations in the Independent industry.

V V

Two Louisiana Independents Ordered to Improve Service

Continuing its drive for better telephone service, the Louisiana Public Service Commission, following hearings held March 26 at Baton Rouge, on April 11 ordered L. R. Hagin, doing business as the Oak Grove (La.) Telephone Co. and Norris Banker, operating the Gonzales (La.) Telephone Co. to show cause why service should not be improved in these vicinities.

The Oak Grove company was ordered to submit within 30 days detailed plans and specifications for better service while the Gonzales company was granted 50 days in which to turn in its report.

V V

Summary of Commission Rulings and Hearings

Federal Communications Commission

April 1: Granted American Telephone & Telegraph Co. authority to extend facilities from Plattsmouth to Brock, Neb.

April 1: Granted New York Telephone Co. authority to supplement and replace open wire facilities between Horseheads, Odessa and Montour Falls, N. Y.

April 2: Granted American Telephone & Telegraph Co. permission to reduce Sunday rates for overseas service from U. S. to Bermuda, and to revise company's toll rate and route guides and tariffs.

April 8: Granted New York Telephone Co. authority to replace existing facilities between Pawling and Brewster, N. Y. Estimated cost, $87,950.

April 10: Granted American Telephone & Telegraph Co. and Southern Bell Telephone & Telegraph Co. authority to construct and operate 548 miles of copper wire and 12 Type "L," four Type "J" and seven single sideband program carrier systems between Atlanta, Ga., and Dallas, Tex. Estimated cost, $958,000.

April 10: Granted American Telephone & Telegraph Co. and Illinois Bell Telephone Co. authority to construct and operate 33 Type "K" and 83 Type "EB" carrier systems between New York, Chicago, St. Louis and other points. Estimated cost, $2,152,000.

April 10: Granted American Telephone & Telegraph Co. and New York Telephone Co. authority to construct and operate underground coaxial cable between Buffalo, N. Y., and Cleveland, Ohio; and to construct eight Type "L," 17 Type "KL," 11 Type "J" and 36 Type "EB" carrier systems between Boston, Mass., New York City and Chicago, Ill., and other points. Estimated cost, $6,048,000.

California Railroad Commission

April 12: Authorized Interstate Telegraph Co. to revise telephone directory advertising schedules in Mono, Inyo, Kern and San Bernardino counties.

Illinois Commerce Commission

April 16: Hearing on request of Urmaoga Telephone Co. for authority to increase rates at Ursa and Lima.

April 16: Hearing on request of Danvers (Ill.) Telephone Co. for authority to increase rates.

April 16: Hearing on application of Illinois Bell Telephone Co. for authority to purchase from American Telephone & Telegraph Co. equipment in auxiliary stations on Chicago-Terre Haute and Terre Haute-St. Louis "K" carrier routes.

April 19: Hearing on petition of Grayville (Ill.) Lions Club for order requiring Illinois Commercial Telephone Co. to install modern equipment in Grayville.

Kansas Corporation Commission

May 6: Hearing on application of Border Telephone Co. for authority to make rate changes at Manter.

New York Public Service Commission

April 23: Hearing on petition of Sheldon A. and David R. Birdsall for authority to sell telephone company to Sheldon A. Birdsall.

Oklahoma Corporation Commission

May 1: Hearing on application of Fred Barrett to require the Oklahoma Automatic Telephone Co. to restore and improve service at Clarita. Continued from April 1.

May 8: Hearing on application of Noble Hardy Telephone Co., Gene Autry, for return of certain territory in and near discontinued army camp.

May 29: Investigation on initiative of Oklahoma Corporation Commission, of rates charged by Sasakwa (Okla.) Telephone Co.

Utah Public Service Commission

May 13: Hearing on intrastate toll rates of Mountain States Telephone & Telegraph Co.

Wisconsin Public Service Commission

April 24: Hearing on application of the Pacific & Wyocena Telephone Co., Wyocena, for authority to increase rates.

April 25: Hearing on application of C. F. and Agnes A. Lewis to sell the Deer Park (Wis.) Telephone Co. to Frederick W. Peterson.

ONCE A YEAR

it receives a visitor!

Raytheon Recticharger

gives trouble-free performance in UNATTENDED locations

ONE, or at the most two, routine inspections a year are usually all that's required! . . . to replace water lost by evaporation.

That's because the Raytheon Recticharger carries the normal telephone current demand—so battery activity is cut to a minimum, and water loss is slight. And since there are no moving parts—virtually nothing to get out of order—repairs are rare indeed.

The Recticharger, with a small battery floated across its terminals, provides a dependable, constant-potential battery-charger and AC to DC power unit for a wide range of automatic communication systems.

It has many other operating advantages. Study them, in Bulletin DL48-263B, fully illustrated. Send for it today.

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Crapo HIGH TENSILE TELEPHONE LINE WIRE
COMPARE THE SPAN LENGTHS!
SIZE NO. 12 B.W.G. HEAVY LOADING DISTRICT
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Crapo High-Tensile Line Wire Cuts Cost of Rural Lines

Spans to 350 feet are possible in Heavy Loading Districts where Crapo HTL-135 Telephone Line Wire is used. This means that, in straight runs over flat open terrain, the number of poles per mile can be reduced to 16.

Substantial economies both in construction and maintenance are the result. Initial building costs are lower because of marked savings in material and labor; up-keep expense is minimized because there are fewer pole structures to maintain. These savings will be an important consideration in the expansion of rural telephone service.

Crapo HTL-135 Line Wire possesses two and one-half times the tensile strength of standard B. B. wire; provides for extra long-span construction. Crapo HTL-85, with 60% greater strength than B. B., makes possible spans well beyond the range of the latter grade. Both Crapo HTL-135 and Crapo HTL-85 have superior telephonic transmission qualities.

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Pertinent information on how to build long-span, low-cost rural lines of Crapo High-Tensile Telephone Line Wire is contained in this new book. Contents include tables of stringing sags and tensions, construction practices, information on guying, metalicizing and transposition, river crossings, etc. Direct your request to your distributor of Crapo Galvanized Wire and Strand or write us!

INDIANA STEEL & WIRE COMPANY, Muncie, Ind.

Crapo HIGH-TENSILE TELEPHONE LINE WIRE

W. F. Corman Returns To Atmore, Ala., Company

After five years in the Army Air Forces, Lieut. Col. William F. Corman has been placed on terminal leave and expects to make his home in Atmore, Ala., where he will be associated with his father, Minor Corman, in the Atmore Telephone Co.

Colonel Corman received his commission as a second lieutenant in the Reserve Officers Corps upon graduation from the University of Oregon in 1937. He held the rank of first lieutenant when he was called to active duty in April, 1941 and assigned to Eglin Field, Fla.

He went overseas in January, 1944 and served with AAF headquarters in England, France and Germany, returning to the states early this year. During his overseas service he attained the rank of major. He holds the Defense Medal, the Bronze Star, American Theatre and ETO ribbons and the Victory Medal. He recently was promoted to the rank of lieutenant colonel.

Before entering active army duty he was manager of the telephone company at Collierville, Tenn.

V V

New Telephone May Aid Mine Disaster Victims

Mine disaster victims may be aided in future rescues by use of a new "batteryless" telephone developed by a Pittsburgh inventor, the Bureau of Mines recently announced.

The two-way telephone works by means of a throat attachment which produces vibrations carried along a wire. The telephone, which enables rescuers to guide and keep in touch with trapped miners, has no batteries because of the danger of sparks in gas-filled mines.

V V

New Coast-to-Coast Line Speeds Airline Reservations

Completion of a coast-to-coast private telephone line, the longest and most intricate private line in the world, was announced April 11 in New York City by Gilbert Mears, director of communications for American Airlines.

The 3,011-mile line—referred to by American Airlines as PLF (private line phone)—was designed for the company's reservations department by the American Telephone & Telegraph Co. The purpose of the line, which will perform the function previously served by teletype machines, is primarily to speed the handling of reservations. PLF also, however, permits simultaneous vocal contact with 400 of the airline's reservation desks throughout the nation within four minutes.

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NORWICH and JEWETT CITY, CONNECTICUT

Rodney W. King, manager of American's reservation department, explained that PLF allows immediate confirmation of reservations, whereas teletype requires verification of receipt of a message and a period of waiting for the answer. He said American got the idea from a private telephone line designed by AT&T to serve pumping stations along the "big inch" pipe-line system running from Texas oil fields to the East Coast.

The major electrical engineering problem for AT&T, he said, was to design a system that would allow the vocal volume to remain constant, regardless of the number of listening posts drawing upon the line. He said AT&T had "solved the problem beautifully." Seven months ago, he said, the line was tried experimentally between New York and Boston, and worked so well that it was extended coast-to-coast, with lines from New York to Dallas, Tex., and from Dallas to Los Angeles, Calif. The line serves the intermediate stations between these points as well.

Working like a system of interoffice telephones, the PLF has monitors listening in on the line constantly at control stations in Boston, New York, Washington, Dallas and Los Angeles. Mr. King explained that the monitors, in addition to routing calls to the proper station, also determine the priority of calls and prevent any violations of the vocal message code.

Explaining that the line is now handling two completed calls a minute, he said American is trying to speed up the process to four calls a minute or a potential of 4,000 calls daily. Because of this speed—necessary to allow reservations to keep up with the movement of the planes—a terse conversational code is used.

There isn't time for "hellos," "goodbyes" or superfluous words, Mr. King explained. A reservations clerk in Nashville will pick up his telephone and say "Nashville—Dallas 104." This means he is seeking the person in Dallas charged with handling reservations on Flight 104.

The monitor buzzes the handler of Flight 104, who replies "Dallas 104." The Nashville reservations clerk then says, "104 19 2 Nashville-New York," meaning reservations for two on Flight 104 from Nashville to New York on April 19. If Dallas has the reservations, the quick reply is "104 19 OK 2." Nashville ends the conversation with the sign-off of "clear."

Mr. King explained that such a situation could be handled while the passenger seeking the reservation waited on the telephone for his answer from the Nashville reservations clerk.

V V

Rising Operating Costs May Force Bell Rate Increase

The American Telephone & Telegraph Co. must maintain its earnings at adequate levels to assure the company's credit in whatever financing is needed in its expansion program, Walter S. Gifford, president, said April 17. He told stockholders at the annual meeting in New York City they would have preemptive rights to subscribe to any new stock or debentures issued to finance the two-billion dollar construction program already underway.

The company may have to seek increased telephone rates if operating expenses continue to increase as they have, he said.

"The system made substantial further wage increases during the first quarter of 1946," said Mr. Gifford in his quarterly report to stockholders. "If costs continue their upward trend, we shall have to ask regulatory bodies, when and where necessary, to permit us to increase revenues by increases in telephone rates."

Mr. Gifford said the Bell System in the first quarter added almost twice as

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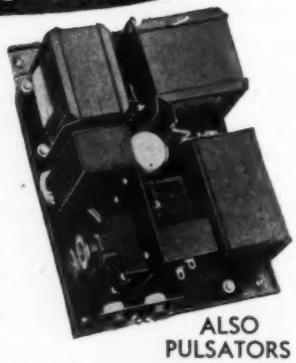

ONE of the prime requisites of an Ideal Ringing Converter is freedom from trouble and worry; another is reliability in delivering efficient, quiet, economical signaling service over long periods of time.

Sub-Cycle meets these requirements completely. Once it is installed, you can forget it. There are no moving parts and nothing to adjust. No chance of interference with radio reception. It is built for heavy duty and the output capacity range is 7½ watts to 40/50 watts. Made in 6 models from small PBX to large central office.

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½ Pint Can (200 grams) 12 per Carton.
1 Quart Can (800 grams) 12 per Carton.

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many subscribers as in any previous quarter. He warned, however, that extensive shortages of equipment will continue throughout 1946.

Almost a million subscribers have been added since January 1 at a rate of about 10,000 per day, he said. Of subscribers whose applications January 1 had been deferred for lack of facilities about half have been serviced.

Despite the record breaking rate of installations new applications continue at unprecedented levels and about 1¾ million applicants are waiting. Plant and equipment will be heavily overloaded for some time.

Mr. Gifford said long distance service is at a record high, about 10 per cent above year ago volume. Construction of additional long distance circuits has proceeded at a rapid rate, but much work remains to be done to restore the speed of prewar service.

AT&T net income in the first quarter, with figures for March partly estimated, rose to $46,076,000, or $2.28 a share, from $40,392,953 or $2.07 a share, a year earlier. Net income in the 12 months ended March 31 was $177,323,000, or $8.86 a share, against year ago profit of $163,065,879, or $8.47 a share.

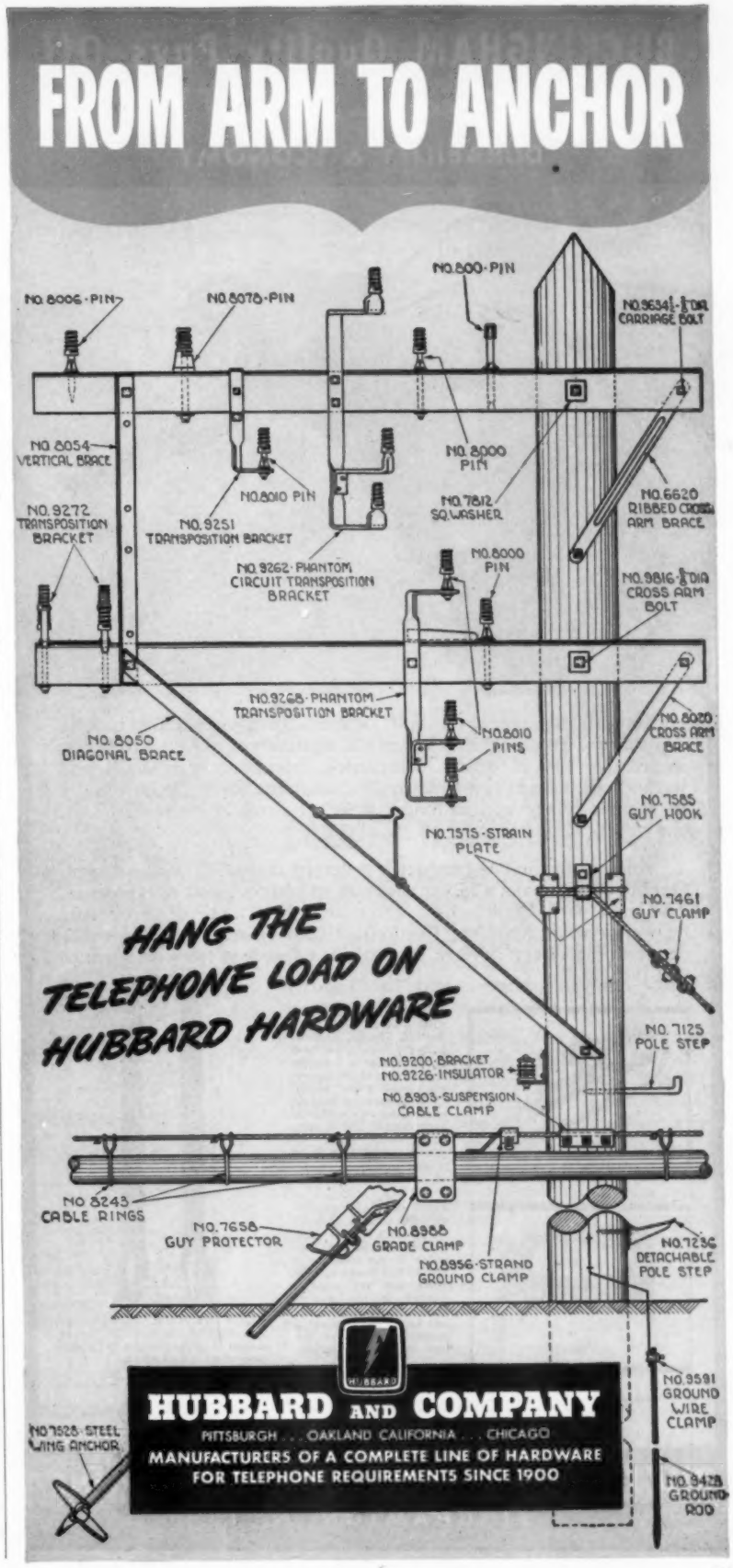
Bell System net earnings in the three months ended February 28 were $50,225,611, or $2.49 a share applicable to AT&T stock, against $46,825,563, or $2.41 a share, a year ago. Profit in the 12 months ended February 28 was $182,357,023, or $9.14 a share, against $173,123,906, or $9.01 a share.

The company considers more and better service at the least cost to be in the interest of stockholders and employes as well as telephone users, Mr. Gifford said at the stockholders' meeting. He added that to accomplish such a program it would be necessary to insure a reasonable return to stockholders and maintain employe working conditions on the best possible level.

Telephone users had "extraordinarily good service during the war years," Mr. Gifford said. In spite of the fact that the cost of virtually everything has gone up, "telephone rates have not been increased but on the contrary long distance rates have been decreased."

In answer to a stockholder's request for a four-to-one stock splitup, Mr. Gifford said directors "at this date feel that the advantages do not outweigh the disadvantages." He said a split-up had been considered over the years but that "we do not fool the public nor achieve better public relations by declaring smaller dividends on more stocks."

Two resolutions by Henry Mayer, attorney for the telephone employes' union, were defeated by large margins.



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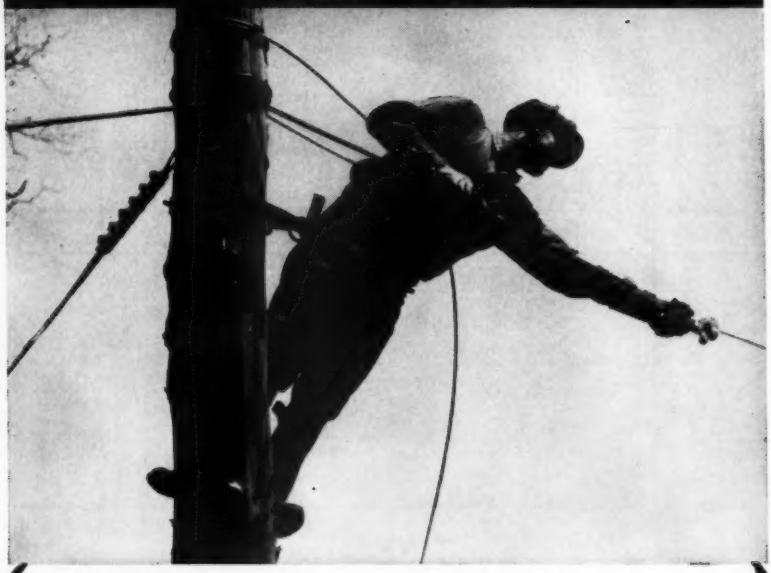

Backed by nearly a half century of outstanding quality reputation, Buckingham linemen's equipment is favored by an impressive list of utility companies, telephone companies and individual linemen . . . because Buckingham quality pays off . . . in greater safety . . . in longer wear . . . and in lower cost over the years.

And quality in the product is reflected in quality of the design. Quality that means a larger measure of comfort and convenience. The man with Buckingham equipment gets more done because he works with complete freedom of movement, complete confidence in his safety devices, and relative freedom from annoyance and fatigue.

BUCKINGHAM STANDARD SAFETY STRAP, No. 42A. The full responsibility for the life and limb of the wearer is foremost in the minds of the experts who make these straps. Only the backs of the best selected harness leather is used. Buckle end is reinforced with metal for greater strength and to prevent wear.

BUCKINGHAM CUSHION DELUXE FLOATING TOOL BELT, No. 56R. Buckingham is the originator of the rolled edge feature that gives a cushion effect and the greatest comfort to the wearer. Floating feature allows full tool loops under all working conditions. Made of the best chrome tan leather.

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Write today for Catalog 24 showing the full Buckingham line.
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One would have increased minimum pensions from $50 a month to $100 a month and the other would eliminate the company's practice of deducting from the pension one-half of the payments made under the social security act.

V V

E. D. Bellamy, Knoxville, Iowa, Died April 21

EARLE D. BELLAMY, general manager of the Bellamy Telephone Co., Knoxville, Iowa, director of the Iowa Independent Telephone Association and ex-president of the association, died April 21 at the Methodist Hospital in Des Moines following an illness of several weeks.

Mr. Bellamy was born in Knoxville, August 25, 1885, and attended Cornell College, Iowa State Normal and the Iowa State University. He started working for the telephone company in Knoxville when he was a freshman in high school and had spent his entire business life with that company.

Mr. Bellamy's father was one of the organizers of the Iowa association. In 1928 the association elected Mr. Bellamy president of the organization for the ensuing year. He served as president for three consecutive years 1928, 1929 and 1930 and had been a director of the association for the past several years.

V V

First Television Network

The nation's first permanent commercial television network was opened April 15 with a two-hour program transmitted to audiences in New York City, Washington, D. C., and Philadelphia, Pa.

Stations in Pittsburgh, Cleveland, Ohio, and Cincinnati, Ohio, will be added.

V V

OBITUARY

Steuart Purcell, 68, chairman of the Maryland Public Service Commission, died April 18 in Baltimore after a short illness.

A native of Ireland, Mr. Purcell was brought to this country as a child. He received an engineering degree from Cornell University in 1901 and then did tunnel and bridge work for the Pennsylvania Railroad, working for a time on the construction of Union Station in Washington, D. C. He entered the employ of the city of Baltimore in 1910. During World War I he was commissioned a captain of engineering in the 80th Division and later was assigned to Hoboken, N. J.

FEDERAL's "*Speech + Duplex*" PROVIDES...

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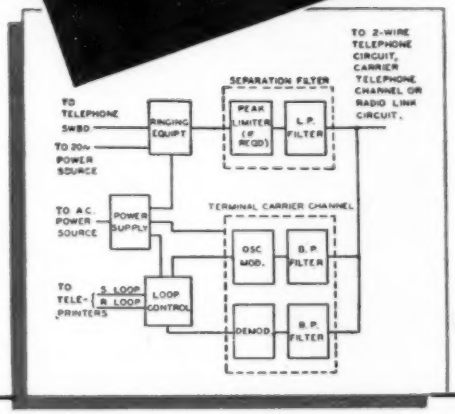
NOW YOU can multiply your message capacity *without* building new lines. Two-way teleprinter traffic—up to 100 words a minute—travels over your present telephone circuit ... and you retain use of the speech channel! Your telephone channel will handle carrier telegraph signals and the voice simultaneously.

This carrier equipment provides either full or half-duplex telegraph operation. The telegraph transmission doesn't affect speech intelligibility. It will work over noisy circuits—telegraph distortion due to noise and interference is practically eliminated by frequency modulation.

The units of Federal's 9-C-1 equipment can be interconnected to meet a variety of requirements. Two Federal 9-C-1 carrier telegraph systems can be applied to each channel of a carrier or radio telephone system. Built to highest engineering standards, Federal's "speech-plus-duplex" is available now for use on all telephonic installations, including private lines of railroads and pipe line companies. Write for details and Federal technical assistance.



Federal Telephone and Radio Corporation

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WITH THE MANUFACTURERS

Stromberg-Carlson Employes Set Safety Record

The Stromberg-Carlson Co., Rochester, N. Y., revealed recently that its industrial accidents in 1945 had dropped more than 47 per cent in number as compared to 1944. This safety achievement, it was pointed out, contrasted sharply with the nation's overall picture. The National Safety Council has indicated that final figures for 1945 on the national record will show an 11 per cent increase of accidents in industry over 1944.

The company won safety awards in both 1944 and 1945. In the final quarter of 1945, employes in Stromberg-Carlson's plant alone worked more than 1,100,000 manhours without a lost time accident, finishing second in New York state among more than 800 industries entered in the Associated Industries of New York's 21st annual accident prevention campaign.

The frequency average was 22 accidents per 1,000 workers in the Empire State, while Stromberg-Carlson had the remarkably low figure of 6.9. Rochester, recently hailed as the state's safest industrial city, struck a city average of 12 accidents per 1,000 workers.

V V

John Dufford Joins Western Electric Co.

John S. Dufford, former engineer with the Automatic Electric Co., Chicago, recently became connected with the manufacturing-engineering organization of the Hawthorne Works of the Western Electric Co., Chicago. Mr. Dufford's duties with Western Electric will be concerned with planning of various phases of the manufacture of central office switching equipment.

Mr. Dufford's connection with the telephone industry dates back to 1936 when he was employed by the American Telephone & Telegraph Co. in construction work during college vacation periods. In June, 1938, he became connected with Automatic Electric Co. and after taking the 13 weeks' full-time training school in automatic telephony he entered the company's production department and later was transferred to the engineering department.

During the time he was with Automatic Electric he held titles of student engineer, associate engineer, engineer, staff engineer and methods engineer. In this work he gained a thorough knowledge of the designing, engineering and production of telephone equipment.

J. S. DUFFORD

Mr. Dufford is a graduate of Rensselaer Polytechnic Institute, Troy, N. Y. and received a BEE degree. At present he is taking a graduate training course in industrial management at the Northwestern School of Commerce. He is a member of Tau Beta Pi and of the Society for the Advancement of Management.

V V

Templeton, Kenly Release New Jack Catalog

A new 64-page catalog, No. 45, of Simplex lever, screw and hydraulic jacks has just been published and is available from Templeton, Kenly & Co., 1020 South Central Ave., Chicago 44, Ill.

Hundreds of jacks of conventional and special types, in sizes from three to 100-ton capacity, are pictured and described in this convenient pocket-size book, with specifications, dimensions, capacities, weights, etc.

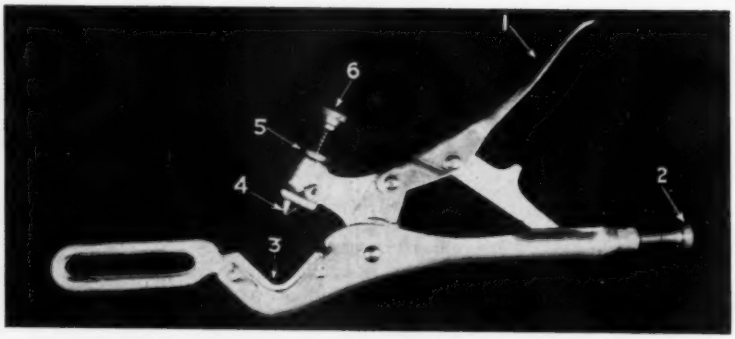
Included are a number of items which were not produced in wartime under Government Limitation Order L-332, and which are again available. Also shown are recent additions to the Simplex line; such as 30 and 50-ton hydraulic jacks for heavy lifting and the new Simplex Track Shifter which is said to provide a labor-saving method of lining railroad track.

Feature pages show jacks in various applications. Two convenient indexes, showing jacks by types and numbers respectively, make this catalog easy to use.

For Spring Construction . . .
and for all year too

JONES CABLE STRIPPER

$7.50 per Unit



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From "Cable Maintenance" By Daniel Seitz TELEPHONY, December 8, 1945

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Indiana Police Test Mobile Radio Frequencies

Extensive frequency tests were conducted throughout the week of February 17-23 over hilly Bedford, Ind., terrain to determine certain propagation characteristics of the new mobile radio bands, 72-76 MC and 152-162 MC in relationship to the lower frequencies of 30-40 megacycles.

The three-frequency test, made possible through the cooperation of the Motorola firm, was initiated by members of the Indiana chapter of the Associated Police Communication Officers, Inc., whose "Indiana Plan" called for state-wide use of one of the new high frequencies, preferably 160 megacycles.

73 megacycle roof-top antenna, foreground. 161 mc. background.

Though characteristics of the higher frequencies were fairly well known for flat terrain, there remained the question of how they would act in rugged country. Bedford, with its nearby limestone quarries, its 200-foot variations of hill and dale, provided the terrain to acid-test the frequencies.

Motorola two-way radio mobile units travelled 40 miles in every direction, each covering more than 1,000 miles. The data, recorded every few seconds at the three-250-watt Motorola FM central stations at the Greystone Hotel, Bedford, indicated that when a deep valley and an intervening hill stopped the signals from the 161-MC car, the 73 MC and the 37 MC signals also were stopped.

All three cars talked back consist-

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Making Sure of His Ground—with a
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GROUND RESISTANCE TESTER
for TELEPHONY, LIGHT, POWER, SIGNAL EQUIPMENT, ETC.

Better Because . . .

1. Self contained power source. No tiresome cranking.
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Fastest testing of all known means. Two models: 251 triple range for general conditions: 255 four ranges for extreme wet and dry. Illustrated: Model 255 Vibroground. Engineering service representatives in all principal cities. WRITE FOR BULLETIN.

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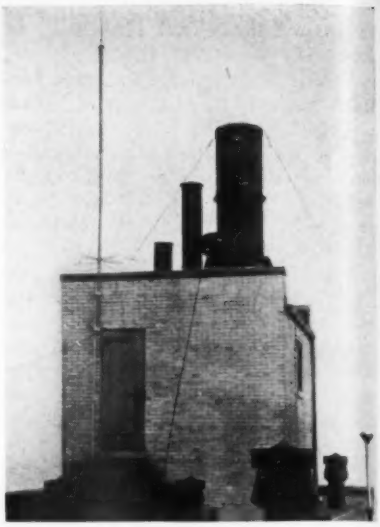


37 megacycle antenna.

ently from 30 to 35 miles. The 161-MC car failed, it is stated, to show "shadow," climbing out of distant valleys as readily as the lower frequencies.

Daniel E. Noble, general manager of Motorola's communication division, stated: "The Bedford tests indicate that there will be no significant reduction in coverage with the higher frequencies, even in rough areas. We not only talked back to central consistently with 30-watt transmitters at distances equal to twice line-of-sight, but also talked car-to-car 18 miles with 161-MC, and car-to-car five miles with a large hill between."

A. C. WITT, Motorola communication engineer, at interphone. RAY BAUMGART, engineer in charge of tests, transmits test messages to cars while HOMER MARRS looks on.

Many observers commented on 160 megacycle's clarity due to a minimum of noise accompanying the signal, and Indiana police have decided to use it for their county and city systems.

V V

Automatic Electric Appoints Dr. E. L. Bowles

Automatic Electric Co., Chicago, Ill., has announced that Dr. Edward Lindley Bowles, staff member of the Massachusetts Institute of Technology since 1920 and head of Electrical Communi-

DR. E. L. BOWLES

cations there from 1924 to 1942, and a leading authority in the field of electrical communications and electronics, has been retained to act as consultant to the company on research and development.

Professor Bowles holds the degree of master of science from the MIT. He received the honorary degree of Doctor of Science from Norwich University in March, 1945.

It is stated the position of MIT in the field of ultra-high frequency techniques at the outbreak of World War II was due largely to Dr. Bowles' early visualization of the potentialities of this region of the electro-magnetic spectrum and to his direct supervision of the Institute's teaching and research programs in this field.

From July 17, 1940, to April, 1942, he was a charter member and served as secretary of the Microwave Section of the National Defense Research Committee of the Office of Scientific Research & Development.

Dr. Bowles holds membership in many academic and professional societies, including the American Institute of Electrical Engineers, Institute of Radio Engineers, American Physical Society, the American Academy of Arts & Science, and the Society of Sigma Xi.

In April, 1942, Dr. Bowles was called to Washington by Secretary of War Stimson to act as his consultant on radar, communications, and allied fields. Later he was also designated Consultant on Communications to the Commanding General, Army Air Forces. He was given over-all responsibility for all Air Forces communications, including radar and radar bombing, navigational aids, and electronics applications. In this capacity he was empowered to act directly for General Arnold.

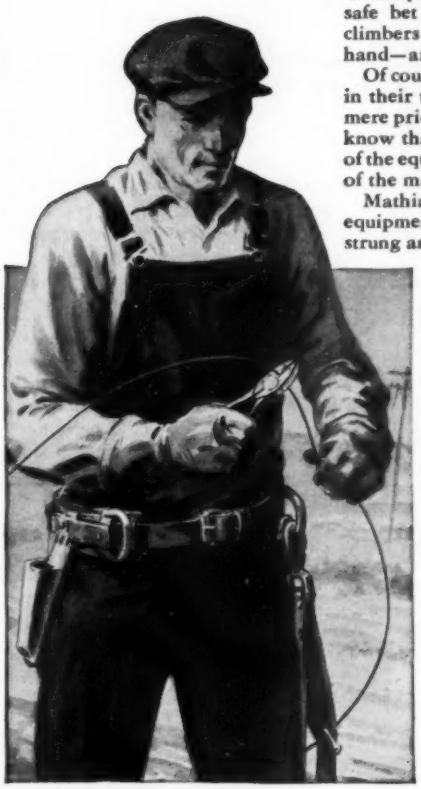
Every Lineman a KLEINMAN

When you see a man on a pole, it's a pretty safe bet that his safety strap and belt—the climbers strapped to his legs—the pliers in his hand—are Kleins.

Of course these men take a craftsman's pride in their tools and equipment. But more than mere pride makes linemen prefer Kleins. They know that their life depends upon the quality of the equipment they use—the experience back of the maker of that equipment.

Mathias Klein and Sons have been producing equipment for linemen since the first wires were strung and today this equipment owes its high quality to the same handcraftsmanship methods—the same individual inspection and testing on which Klein reputation has been based "since 1857."

While today's demand exceeds production and all users cannot be supplied as rapidly as we would like, your supplier will furnish genuine Klein equipment as soon as he can.



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No. 201-NE side cutting pliers. Made in 5, 6, 7, 8 and 9 inch sizes. One of a complete line of pliers for every electrical need.

No. 1901-M Climber. Standard weight for maximum strength . . Made in all sizes. One of a complete line of Klein climbers.

No. 5233 Klein-Kord safety strap. Made of multiple plies of long staple cotton, specially woven and vulcanized in rubber. Uniform strength throughout. Red center gives positive warning of wear.

No. 1628-5BH Klein Chicago Grip. One of the complete line of Klein Grips. Made of forged steel with bronze lined jaws. Patented safety latch prevents falling off wire—may be applied close to pole and slid out required distance. Ideal for hot line work.

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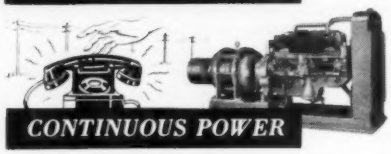

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Dr. Bowles rendered outstanding service to the country through his contributions to the development and application of radar and other important electronic developments for military uses and in establishing policy and implementing plans for the Army in a variety of technical fields. On November 14, 1945, he received the Distinguished Service Medal in recognition of his work.

V V

Newly Organized Signal League Elects Officers, Directors

The Signal League, a civilian association of wartime communications officers and manufacturers was recently organized in Chicago with the election of officers and seven members of its Board of Governors. The League was established to encourage postwar application of wartime research, development and training in communications.

Major Gen. James A. Code, Jr., retired, wartime assistant Chief Signal Officer of the Army, and now vice president of Automatic Electric Co., was elected chairman of the Board of Governors; William J. Halligan, head of The Hallicrafters Co., was chosen president; S. I. Neiman, wartime director of public relations for the Signal Corps in Chicago was elected executive secretary and the following were named to the Board of Governors:

Edward W. Shepherd, of Philco Corp.; Jerome J. Kahn, of Standard Transformer Corp.; Leslie F. Muter, of the Radar-Radio Industries of Chicago, Inc.; Frank J. O'Brien of Galvin Manufacturing Co.; Oliver Read of Radio News; U. A. Sanabria of American Television Laboratories and Horace M. Carleton of E. B. Mathewson Co.

The Signal League has established headquarters in the One North La Salle Bldg., Chicago, as an Illinois not-for-profit corporation.

Hailing the League's organization as a forward step in the utilization of wartime developments for the public's benefit, General Code praised the industrial harmony among Chicago manufacturers which contributed to the production of the tremendous volume of telephone, radar and radio equipment used by the armed forces during the war.

The League took over quarters formerly occupied by the Signal Corps commanding general in Chicago during the war. In a ceremony formally closing the Signal Corps office, the corps banners which had been presented by members of the industry during the war were turned over to the city of Chicago. The mayor's office, represented by Fred V. Maguire, in turn gave the insignia to Mr. Halligan to be placed in the Signal League archives as a memento of Chicago's contribution to wartime electronics production.

The League's charter is written to admit as members manufacturers who made "a significant contribution" to production for the armed forces; other civilians who contributed time, services or support to the communications branches, as well as former members of the armed forces who contributed leadership or helped expedite production.

V V

Stromberg-Carlson Promotes N. W. Baldwin

N. W. Baldwin has been named Stromberg-Carlson's Rochester, N. Y., telephone sales manager, Arthur F. Gibson, the company's assistant general sales manager, has announced.

In his new position, Mr. Baldwin will have direct supervision of telephone salesmen, sales engineers, and other personnel assigned to telephone and switchboard sales in the Rochester telephone sales department. This territory embraces everything east of the Mississippi except the states of Illinois, Indiana and Michigan.

N. W. BALDWIN

Mr. Baldwin returned to the government contract department of the home office in 1940 after serving for 25 years as vice-president and general manager of the Stromberg-Carlson Co., Ltd., Toronto, Ont. Since 1941 he has filled the liaison post of contacting armed forces communications equipment procurement officers in Chicago, Ill., Dayton, Ohio, and Philadelphia, Pa. Prior to his service with the company subsidiary in Canada, he had worked for eight years in the drafting and engineering departments and had

spent two years in the field as a telephone salesman.

Born in Adams Basin, N. Y., Mr. Baldwin was educated in Rochester schools and the Rochester Institute of Technology. He joined Stromberg-Carlson more than 40 years ago after first participating in preliminary surveys for the proposed Barge Canal.

V V

Metropolitan Issues Report On Training Supervisors

The increased emphasis on the human factor in modern industrial relations is reflected in a new report, *"Training Supervisors in Human Relations,"* which has just been issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Co.

The study, designed to assist business organizations in developing supervisory skill in human relations, is based on the practices of 39 companies which have developed training programs and on the points of specialists.

Pointing out that no matter how technically proficient they may be, supervisors or foremen are doing only half their job if they haven't developed a skill in human relations, the report emphasizes the fundamental principle that supervisors must possess the "know-how" in working with people.

The initial steps of formulating a training program, selecting the training personnel, defining their duties, and setting up training policies are outlined by the report. The report also offers an analysis of the types of courses given, their relationship to other forms of training, the duration of the program and certain techniques of the procedure.

It is explained that although it is difficult to evaluate the skill of supervisors in handling human relations matters, the final measurement of this skill would be the long-term effect on production and on employe morale. In this connection, human relations is described in the report as *"the art of dealing with people in such a manner that they will want to conduct themselves in a desired fashion."*

Appended to the report are a training program proposal, a training outline, and a case study used in a conference.

A limited supply of the report is available for executives. Requests should be addressed to the Policyholders Service Bureau, Metropolitan Life Insurance Co., One Madison Ave., New York 10, N. Y.

V V

» *To improve the golden moment of opportunity, and catch the good that is within our reach, is the great art of life.*—**Samuel Johnson.**

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WANTED TO BUY: One magneto, common battery or PBX switchboard in good condition. Write 401 Labor Building, Raleigh, N. C.

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FOR SALE: Immediate delivery, No. 17 twisted pair insulated bronze drop wire at $16.65 per 1,000 feet. No. 22 triple braided rubber covered olive green interior wire at $14.15 per 1,000 feet. Address Telephone Repair & Supply Co., Rogers Park Station, Chicago 26, Ill.

Two magneto exchanges, 650 telephones, 35 miles apart. Own toll lines. Gross per month, $1,500. Can show 30 per cent on investment. Write Box 2264, c/o TELEPHONY.

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FOR SALE: Cable terminals. Six, 10-pair Reliable protected. Ten, 25-pair. Reliable protected. Five, 10-pair Western Electric unprotected. Two, 25-pair Western Electric unprotected. All for $345 plus freight. Write Howard H. Lahr, 1211 W. Seventh St., Hastings, Neb.

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